

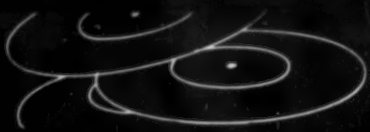
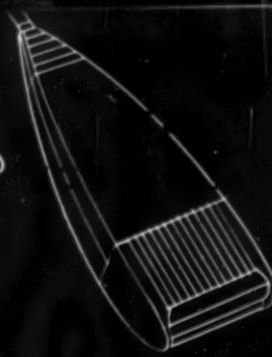
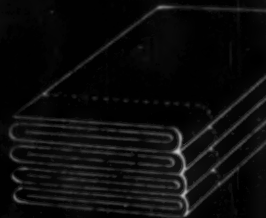
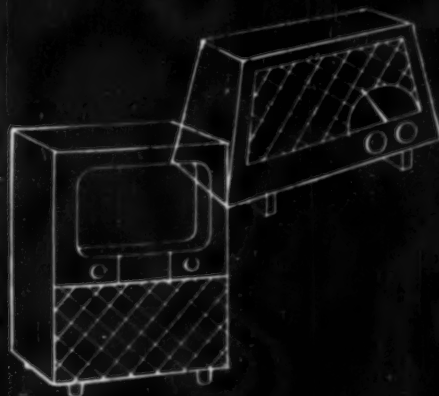
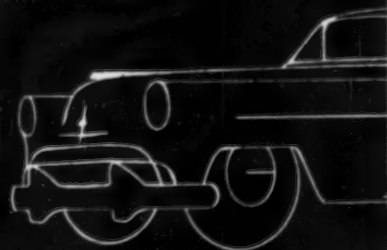
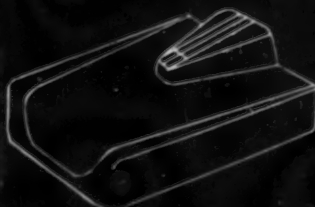
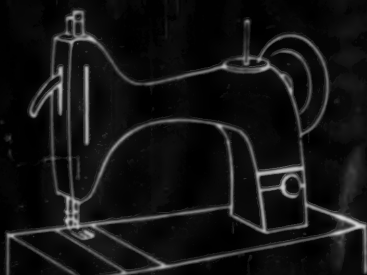
Consumers' Research

BULLETIN

AUGUST • 1955

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Consumers' Research functions to provide unbiased information on goods bought by ultimate consumers. For their benefit (not for business or industry) and solely with the funds they provide, CR carries on tests and research on a wide variety of goods, materials, and appliances, and publishes the findings in CR BULLETIN. Consumers' Research is a non-profit institution, and is organized and operates as a scientific, technical, and educational organization.

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OFF THE EDITOR'S CHEST

HAVE you given a thought to buying your Christmas presents while on vacation this year? According to all reports, Americans are thronging in unprecedented numbers to fill outgoing steamers and airplanes, and U. S. highways are jammed with vacation-goers. Since shopping is an essential part of sight-seeing, why not combine pleasure with duty and buy this year's Christmas gifts while surveying shops, markets, and department stores?

Keep in mind, however, that department store buyers also take trips to interesting parts of the world. The chances are you will find a great many of the better and more outstanding products of foreign lands in the better stores and shops throughout the United States at about what you would pay for them abroad, counting time and effort and porters' fees. The chief exceptions are liquor, perfume, and cameras on which tariffs and excise taxes are high, and prices abroad are often low.

There are, of course, always characteristic items to be found in overseas markets that are especially interesting and attractive. An excellent book for a capsule list of what to buy in various countries will be found in New Horizons, put out by the Pan American World Airways, available in nearly any book store.

Automobile tourists in the United States who are passing through or near large cities will find many excellent bargains in the better department stores, most of which will be air conditioned so that shopping can be done in comfort. Prices and selection are much better than they will be in November and December. Those who wish to look for unusual gifts will do well to consult Tour and Shop, put out by the Tour and Shop Service, 1715 Walnut St., Philadelphia 3, Pa. (\$2). This little book lists the names and addresses and specialties of mill shops where you can buy from the manufacturer at reduced prices, and craft shops which specialize in handmade jewelry, hand woven fabrics, ceramics, sculpture, and painting.

is not to be reprinted, quoted, or reproduced by type, mimeographing, photolithography, Photostat, or by other means, in part or in whole except when special permission has been asked and granted in writing. Use of CR material for any advertising purpose is not permitted. It will be advantageous if you will, whenever possible, send prompt notice of change of address at least 5 weeks before it is to take effect, accompanying your notice with statement of your old address with name in full. At least a month's notice must be given in any case. This rule, however, regarding long advance notice does not apply to military personnel. CR will, of course, gladly change addresses for men and women in the services as often as required by changes in station and other circumstances.

Symbols used to indicate sources of data and bases of ratings: AA—regarded as worthy of highest recommendation; A—recommended on basis of quality; B—intermediate with respect to quality; C—not recommended on basis of quality; cr—information from Consumers' Research's own tests or investigations; 1, 2, 3—relative prices, 1 being low, 3 high. Note that price and quality are completely differentiated in CR's listings; a quality judgment is independent of price; 54, 55—year in which test was made or information obtained or organized by the staff of Consumers' Research.

The Consumers' Observation Post

WINDOW AIR-CONDITIONING UNITS in older apartment houses and office buildings may put too heavy a load on electrical circuits in such buildings, where service lines were installed in earlier days when loads were much lighter. Testimony before a congressional committee brought out the fact that in Washington, D.C., hundreds of complaints about defective operation of window-type units have come from building owners and tenants. The chief difficulty has been that there was insufficient current available on the upper floors of apartment buildings to operate the units when they were plugged into regular 15-ampere outlets, indicating an overloaded wiring system. Another problem is that while the running load of a particular unit may be within the 15-ampere range, the starting load will be somewhat higher, and no information about the current required for starting will appear on the label. It will be wise for purchasers to make certain that the circuits of their buildings that supply their room or apartment have sufficient capacity to meet the starting load of a window air-conditioning unit, before deciding on a particular make.

* * *

SOMETHING NEW IN SYNTHETIC TOILET BARS is making its appearance in selected areas of the country. Put out by Lever Brothers, an opaque white bar combining soap with 25 percent high lathering synthetic detergent and cleansing cream is being distributed in drug, food, and department stores. Called Dove, the bar sells at 2 for 39 cents. Other brands of the synthetic bar type of product are Charmis and Zest.

* * *

BLUE DENIM PANTS which have been the standard uniform for teen-agers of both sexes have recently declined in popularity. According to the advertising journal, Tide, the appeal of blue denim has declined because there is a growing tie-up in the public mind between blue jeans and juvenile delinquency. Photographs of youthful gangs in big cities frequently show them clad in blue jeans and black leather jackets. The denim trade has engaged a public relations council to improve the standing of their product in public opinion by giving wide publicity to photographs of outstanding students on college campuses, all wearing blue jeans.

* * *

THOSE BRIGHT TWO-TONE AND THREE-TONE AUTOMOBILES that have been so popular this year are scheduled to be superseded by more sober colors next year. At least that's the prophecy of The Wall Street Journal, which reports that some auto men see a shift in public preference to darker and more conservative hues such as gray and maroon. On the other hand, the newspaper reports that the color stylist announced that Chrysler has already selected a more brilliant red than the current "Seminole Scarlet," now offered on Plymouths, and the Dodge is expected to be put out in three tones for several years yet. It appears that black will be available, but so will some bright hues "for the extroverts," as one of the trade's experts put it.

* * *

TOOTH DECAY has been reduced in India by the presence of natural fluoride in table salt, according to Dr. James H. Shaw of the Harvard School of Dental Medicine, Boston, who studied a number of teeth extracted in a dental clinic at Delhi, India. He found that the average level of the fluoride content in the enamel and in the dentin was sufficient to retard decay. In looking for the source of fluoride intake, Dr. Shaw discovered that the table salt used was prepared by evaporation from the Indian Sea and supplied as much fluoride as would be contained in drinking water with 2.5 and 3.5 parts of fluoride per million parts of water. Dr. Shaw pointed

out, reports Science News Letter, that this was the first major piece of evidence that fluoride-containing substances other than drinking water can aid in the prevention of caries. He might have added that use of fluoride-content salt in this way is a much more economical way to provide the medication for those who want it, than compulsory fluoridation of municipal and city water systems that must be used by all, not just those who can profit by fluoride in their drinking water.

* * *

WRAPPING MEAT OR TURKEY IN ALUMINUM FOIL before roasting may keep the oven from being spattered with grease, but the roast may taste like steamed or boiled meat. The studies of two researchers, reported in a publication of the University of Wisconsin, on pork loin and turkey indicated that the foil-wrapped meat shrank slightly more in cooking than uncovered meat roasted at a lower temperature, and the flavor of the wrapped pork loin was considered poorer. The flavor of the white meat of turkey was the same in both methods, but the dark meat was juicier when cooked unwrapped.

* * *

SOMETHING NEW IN CRIME DETECTION was introduced in a California court last May when a motion picture projector and a tape recorder were brought into court to reproduce a TV commercial introduced in evidence in a case of false advertising. Reproduction of the commercial in court was, according to Advertising Age, considered to be a major factor in the conviction of both defendants.

* * *

THE DIFFERENCE BETWEEN A WARRANTY AND A GUARANTEE is not to be found by consulting a good dictionary, which will likely indicate they are somewhat synonymous. A distinction between the two according to trade usage is well expressed by Electrical Merchandising. The magazine defines a warranty by the manufacturer as a promise to replace at the factory a part or unit found to be defective. A guarantee implies a diagnosis of the failure of an item and furnishing the labor required to replace the part and put the equipment into operating condition. The specific terms of either a warranty or a guarantee should be clearly spelled out by the dealer or salesman in writing before the purchase is concluded, and the wise consumer will insist on this if the terms are not clearly set forth in the printed forms which are usually signed and returned to the manufacturer. The magazine points out that some appliances with five-year warranties include labor for the life of the warranty, while others include labor for the first year only. In some cases, certain parts of a refrigerator or an automatic washing machine are guaranteed, but not the operation of the entire unit.

* * *

EXPOSURE TO THE SUN sometimes causes the development of fever blisters. The disfigurement in time disappears without any medication whatever. The Journal of the American Medical Association suggests that the application of a good sunscreen preparation before exposure is sometimes helpful in preventing the development of such unsightly blemishes. The J.A.M.A. suggests that after they appear they may be sponged with an 0.5 percent solution of aluminum subacetate, followed by the application of an antibiotic ointment.

* * *

WILL IT FADE? That is the first question consumers asked sales people before making a purchase of fabrics. The worst offenders in this respect were curtains, draperies, upholstery, dresses, along with blouses, skirts, and sportswear, according to a survey by the American Cyanamid Company. Three out of four retailers who answered the questionnaire reported that customers blamed the store for selling faulty merchandise. The National Retail Drygoods Association which is sponsoring a proposed American Standard for all textiles will be wise to throw the weight of its technical resources and the prestige of its member stores into an effort to secure speedy adoption of such an effective yardstick for assuring consumers better quality products in the textile field.

(The continuation of this section is on page 33)



Children's Shoes

PROPER shape and fit are the most important factors to consider when buying children's shoes—more important even than when buying adults' shoes. A great deal of trouble with feet starts in childhood because of poorly fitting shoes. The wrong shoes, besides being uncomfortable, will wear out more rapidly and may result in deformities of the feet and favor poor posture.

Children's feet grow so rapidly that sometimes shoes are too small before they are worn out. On the other hand, some mothers complain that buying shoes is a problem that arises at too frequent intervals. It is not always the quality of a pair of shoes that determines its wear-life. Much depends on the habits of the individual child. One economy-minded mother finally gave up the hopeless task of dissuading her young daughter from skipping rope all the way home from grade school and budgeted a pair of low-priced shoes a month for her. It was her observation that, with her daughter's play-habits, expensive shoes of good quality wore out just as readily as the cheaper makes. With a new pair of shoes a month, the girl was at least assured of not having to wear shoes that she had outgrown.

One frequently sees children use toe or heel to propel or brake a wagon, tricycle, scooter, or bicycle on a cement pavement. Such contact with abrasive surfaces will naturally wear rapid particular parts of any shoe, no matter how

good its quality. On the other hand, a less active child and one whose parents encourage the frequent use of shoe polish and the wearing of rubbers or galoshes in stormy weather will be more likely to outgrow shoes before they are worn out. In the first case, parents will probably have trouble in finding a brand of shoes that gives what they consider satisfactory wear; in the second case, most well-fitted shoes in the *A-Recommended* and *B-Intermediate* groups will probably give good service.

The fit of shoes

It is not advisable to buy shoes by mail or "off the counter," solely by size. A good fit can be assured only by trying on the shoes. There is considerable variation among shoes, even those marked with the same size. There is no need to use a fluoroscope or X-ray device—no regulations can make shoe fluoroscopy safe, and a good shoe salesman can assure a good fit without this technique. Both shoes should be tried on and laced properly, and the child should stand with his full weight borne equally on both feet. A good fit can be judged by the following points: eyelets should be parallel; the distance between tips of the toes of the foot and the toe of the shoe should be $\frac{1}{2}$ inch to $\frac{3}{4}$ inch; the widest part of the foot should be at the widest part of the shoe; the shoe should not gape at the sides or at the back when the child raises his heel and bends forward so that the weight of the

body is on the toes; the back of the shoe should not slip or ride up and down in walking; and the shoe should feel comfortable. It is not wise to use "hand-me-downs" unless they are in really good condition and fit well.

Features of a good shoe

Shoes, especially for children, should not be stiff; both soles and uppers should be flexible, but the soles should be of full thickness and strong for proper wear and protection of the feet. An arch-supporter shoe or other corrective shoe should not be worn except when and as advised by an orthopedic physician. Such shoes may do definite harm when used improperly or unnecessarily.

Heels should be broad and low. Rubber heels, although desirable because they lessen jarring and are quieter, are not as durable as leather heels and tend to run over on the side. Uppers should be of leather of good quality.

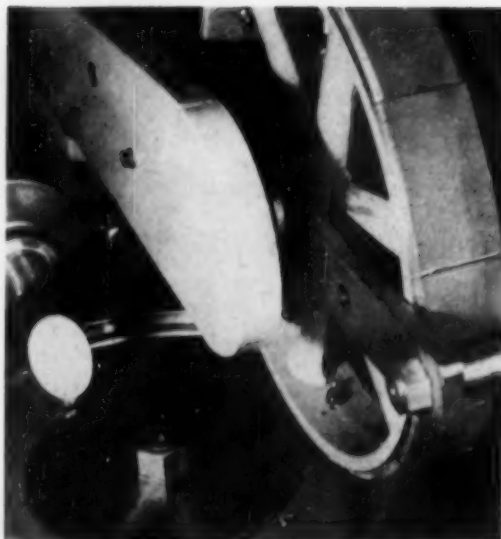
The seams joining the leather and canvas linings inside of the shoe should be free from rough places, and there should be no ridges anywhere which can abrade or press into the feet. The lining of the heel should be smooth leather and seamless; a vertical seam or ridge in the middle of the heel section is likely to cause blisters or callouses. It is advisable to run a finger around the inside of the shoe before buying. The toe lining should be a good grade of smooth canvas, waterproofed to protect the uppers from perspiration. Counters and heel pads should be of leather. A seamless heel is considered best for retaining shape of the upper. Eyelets of metal inside and out are the easiest for children to lace and less likely to come apart.

Care of shoes

Although children's shoes are generally outgrown in from three to five months of wear, correct care of footwear can make them presentable during their expected wear-life, and in some cases cut shoe bills. Two pairs of shoes are not necessary, but they are desirable. When the shoes are worn on alternate days, they will dry out more completely and their life will be pro-



Shown above are examples of the construction used in the heel section of children's shoes. From left to right—no rear seam or seamless (most desirable), partial rear seam, straight rear seam, and tab-style rear seam.



Wallace Abrader, used for testing the wearing qualities of the outsoles. Test specimens, at right in picture, are cemented to aluminum plates, fastened to the wheel which drives lower horizontal disk holding the abrasive. The disk is retarded by a constant braking force.

longed. Uppers which are constantly wet with perspiration will fail much sooner by cracking and ripping.

Mud, water, and excessive dryness also ruin leather. The life of shoes can be extended by keeping them clean and polished. Frequent polishing will keep the leather soft and pliable and will provide a finish that will make the leather more resistant to collection of dust and dirt. Shoes should be repaired promptly when, for example, a seam becomes ripped or the outsole has worn through. If the necessary repairing is put off, the shoes may become so badly worn or twisted out of shape that they will not be worth mending. Heels should be corrected as soon as they become run over in use. When heels begin to run down on one side, shoes are put under a strain and become twisted out of their normal shape.

When leather becomes wet, it can be stretched out of shape easily and stitches can readily cut through the leather. The wear is also accelerated considerably. Wet shoes should always be put away with shoe trees, or stuffed with paper to hold their shape. They should be permitted to dry naturally and in a dry place away from heat and sunlight. While the shoes are still damp, leather soles and uppers may be rubbed with castor oil—only as much as the leather will absorb—and allowed to stand until dry, followed by polishing.

Results of tests

How to test shoes so as to provide consumers with an effective evaluation of their quality is not an easy matter to determine. The shoe trade is inclined to take an uncompromising position that the only way to test children's shoes is to have children wear them. One proponent of this view reported that he worked effectively with a children's orphanage, and each pair of shoes as it was worn out was returned to him for examination and analysis. This technique enabled him to correct the defects of materials and methods of construction so successfully that he was confident in claiming that, in his production of children's shoes, 90 percent of those failures that occurred were due entirely to defects in workmanship. Another contended that the only way to get a correct picture of the quality of children's shoes was to put not less than 12 identical pairs on as many children and let them wear the shoes until a certain point of wear was reached.

This type of test was used in an excellent study of children's shoes by Dr. Robert B. Hobbs of the National Bureau of Standards, published in 1952 in a shoe trade journal. The wear test included over 100 pairs of shoes, and the length of time they were worn ranged from a minimum of 20 days to a maximum of 7 months. The study showed which parts of a shoe wore out first, and what materials were most satisfactory for various parts of a shoe. The tentative conclusions as applied to boys' footwear included: chrome retan upper leather is more resistant to scuffing than chrome "elk" upper leather; uppers without back seams were superior to conventional uppers in resisting breakdown; rubber heels were not sufficiently durable as to match the wear-life of the soles; leather counters

seemed to be more durable than fiber counters, but either was satisfactory if treated with care; lining fabrics treated with resin were no more durable than untreated fabrics for the period during which the shoes were worn.

These observations are obviously useful to manufacturers of boys' shoes and interesting to others who have occasion to study the problem, but the parents of a growing boy will not be able to apply the information to determine just which brand of shoes to buy him for most satisfactory fit and wear. They are in no position to buy shoes on a "specification" basis. Indeed, the whole purpose of the testing technique used by the Bureau was to permit detailed observation of wear factors, and no effort was made to evaluate the qualities of one brand against another.

One manufacturer of a composition sole, also a vigorous proponent of the theory that tests of the shoes in actual use are the only proper way to test soles, sets forth his views at length in a little leaflet which takes a dim view of most laboratory techniques. It is his company's contention that walking tests such as they use, for which they employ people, particularly during the summer months, to walk continually on shoes with various kinds of soles and heels, are the only reliable technique, although they admit that the method is quite expensive.

The elaborate and carefully worked out technique of testing and evaluating shoes on a comparative basis, including laboratory wear tests, dissection, inspection, and identification of composite parts that Consumers' Research has developed and used for some 15 years, provides a method that is entirely free from variations due to personal wear factors that vary from person to person or from one child to another.

As a check, however, we did make a wear test on the brands included in the current report in



Shown above are 4 of the 20 brands of shoes tested by CR as they looked before and after about 5 months of wear.



Remains of a boy's shoe after dissection for tests.

cooperation with those supervising the children in a near-by orphanage where a large group of boys were fitted with shoes of the various brands included in this report. The shoes worn by this group of boys ranged in size from $12\frac{1}{2}$ to 4, and the test was carried on during a period of approximately 5 months.

The chief conclusion to be drawn from that experiment is that the wearing of shoes by children does not provide a proper basis for rating. Shoes worn by children who are quite active and who do not take care of their shoes wear out faster and are more unsightly in appearance than those worn by children who are more restrained in their activities and take pride in the appearance of their shoes. In some cases, one shoe was evidently given much harder wear than the other.

To have done justice to each brand included in the test, it would have been necessary to allocate one pair of each of the 20 brands to each of the 20 boys so that each one had an opportunity to wear all of the brands. That would have involved increasing the time required to complete the test to approximately 8 years, during which time most or all of the shoes would no doubt have been changed in construction and materials a number of times, so that the results of the study would have been of academic rather than practical interest to ultimate consumers. We have, therefore, come to the conclusion that rating shoes on the basis of actual wear involves too many variables, and would require far too long a time to be of any practical value to con-

sumers, whose children would have grown up in the meantime.

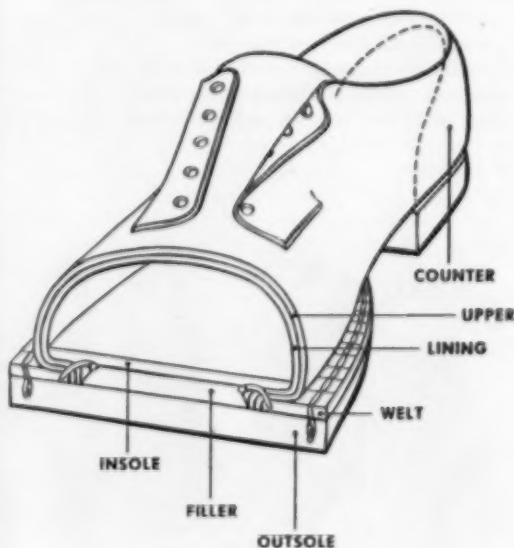
The test methods included a complete dissection of the shoes, and a lengthy series of measurements and observations on the component parts. In addition to the laboratory and actual performance tests the shoes were examined by a skilled orthopedic surgeon for design. In general, all shoes met the requirements of good design. Several, however, had built-up insteps which are not recommended except on the advice of a physician.

There is an increasing tendency to use rubber, plastic, or similar sole material. Such soles are generally more waterproof, grip better, and are usually tougher than leather, but most of them become too flexible after wearing, permitting a lot of twist, which is especially bad for weak arches, and when there is already a tendency for the child to run the shoes over on the side.

Unless otherwise noted, all shoes had rubber heels, and were made by the welt process (desirable) as compared to the stitchdown construction. Prices shown in the listings are for the sizes purchased for test.

A. Recommended

Buster Brown (Brown Shoe Co., St. Louis 18) \$6.95 and \$7.95. Strong upper leather. Fully lined with leather and fabric. Rear only was reinforced. Very good insole. Fiber counter, straight heel seam. Has full toe piece of sharkskin, and chrome retan upper leather, which resists scuffing. Heel of poor



Well-type construction.

wearing qualities. Outsole of synthetic material of high wear resistance per unit of thickness, but was among the thinnest soles in the group. **2**

Child Life (Herbst Shoe Mfg. Co., Milwaukee 45)

\$7.95. Strong upper leather. Fully lined with leather and fabric. Virtually no reinforcements. Satisfactory insole. Leather counter, partial rear seam. Moccasin-type toe. Lower section of upper and heel section of sharkskin, of good scuff resistance. Heel of very good wearing qualities. Tongue and fabric lining all one piece, good. Outsole of leather of high wear resistance per unit thickness, but thinner than average. **3**

Fleet-Air (Eby Shoe Corp., Ephrata, Pa.) \$7.95.

Satisfactory upper leather. Fully lined with leather and fabric. Fully and well reinforced. Substantial insole. Fiber counter, straight rear seam. Full toe cap of sharkskin. Heel of fair wearing qualities. Outsole of leather of above average thickness, but low wear resistance per unit thickness. **3**

Flying Aces (Dr. A. Posner Shoes, Inc., New York 1)

\$7.95. Good upper leather. Fully lined with leather and fabric; leather portion in two pieces. No reinforcements. Substantial insole. Leather counter (heavy), tab-style rear seam. Full toe cap of sharkskin. Heel of good wearing qualities. Outsole of leather of above average thickness, but low wear resistance per unit thickness. **3**

Weather-Bird (Peters Shoe Co., Division of International Shoe Co.) \$7.95.

Upper leather of good physical properties. Fully lined with leather and fabric. No reinforcements. Good insole. Leather counter, no rear seam; desirable. Full toe piece of chrome leather. Heel of good wearing qualities. Insole extends to form arch support which may not be desirable unless prescribed by a physician. The outsole of leather was about average in thickness and of good wear resistance per unit thickness. **3**

B. Intermediate

Acrobat (Acrobat Shoe Co., Division of General Shoe Corp., Nashville 3, Tenn.) \$6.95.

Generally weak upper leather. Fully lined with leather and fabric. Vamp only was reinforced. Standard insole of light weight extends for arch support (see *Weather-Bird*). Fiber counter, tab-style rear seam. Full toe piece of sharkskin. Heel of fair wearing qualities. Synthetic outsole was slightly above average thickness, but in the lower range of wear resistance per unit thickness for synthetic soles. **2**

Classmate (Ideal Shoe Mfg. Co., Milwaukee 12)

\$6.95. Strong upper leather. Fully lined with leather and fabric; leather portion in two pieces. No reinforcements. Insole of cemented type, considered weak. Fiber counter, tab-style rear seam. Toe piece of chrome leather not very scuff-resistant. Heel of good wearing qualities. A thin leather sole, but of very good wear resistance per unit thickness for leather. **2**

Sundial Bonnie Laddie (Sundial Shoe Co., Division

of International Shoe Co., Manchester, N.H.) \$6.95. Upper leather of fair physical properties. Fully lined with leather and fabric. No reinforcements. Satisfactory insole. Leather counter, straight rear seam. Full toe cap of chrome leather. Heel of good wearing qualities. The outsole was a synthetic material of below average thickness; its wear resistance per unit thickness was somewhat low for synthetic soles. **2**

Edwards (J. Edwards & Co., Philadelphia 7) \$7.98.

Satisfactory upper leather. Fully lined with leather and fabric. No reinforcements. Insole of cemented type, considered weak. Fiber counter, straight rear seam. Full toe piece of sharkskin, which, with chrome retan upper leather, makes for scuff-resistant shoe. Heel of poor wearing qualities. The weak insole and poor heel were undesirable features of this shoe, but its outsole of synthetic material had very good wear resistance per unit thickness. **3**

Foot-so-Port (Foot-so-Port Shoe Co., Oconomowoc, Wis.) \$10.95.

Physical properties of upper leather, good. Fully lined with leather and fabric; leather portion in two pieces. Fully reinforced. Fiber counter, straight rear seam. Chrome retan, full toe cap. Heel of poor wearing qualities. Outsole of leather of above average thickness, but of very low wear resistance per unit thickness. A corrective shoe with built-up arch and Thomas heel; should be worn only when prescribed by a physician. **3**

Kali-sten-iks (The Gilbert Shoe Co., Thiensville, Wis.) \$8.95.

Physical properties of upper leather, somewhat below average. Fully lined with leather and fabric. Fully reinforced. Very good insole. Leather counter, no rear seam; good construction. Full toe piece of chrome retan leather. Heel of good wearing qualities. While outsole was somewhat below average thickness, it had best wear resistance per unit thickness of the leather soles; almost equal to poorest synthetic. Shoes toe in; may be unsatisfactory for many children from an orthopedic standpoint. **3**

Official Boy Scout (International Shoe Co., St. Louis 3) \$7.45 and \$8.45.

Upper leather of about average physical properties. Fully lined with leather and fabric; leather portion in two pieces. Fully reinforced. Good insole. Fiber counter, tab-style rear seam. Moccasin-style toe; has no separate toe piece, considered undesirable. Heel of fair wearing qualities. Outsole of rubber of great thickness and good wear resistance per unit thickness; likely to become too flexible when soles wear thin, not considered good for a child with weak arches. It should be noted this sole is of a type which may tear loose. **3**

Pied Piper (Pied Piper Shoe Co., Wausau, Wis.)

\$8.95 and \$9.50. Upper leather of only fair physical properties. Fully lined with leather and fabric. Vamp only was reinforced. Very poor insole construction. Fiber counter, only partial rear seam. Full toe piece of chrome leather. Heel of poor wearing qualities. Outsole of leather of about average thickness, and somewhat low wear resistance per unit thickness. **3**

Pro-tek-tiv (Curtis, Stephens, Embry Co., Inc., Reading, Pa.) \$8.50. Upper leather of good physical properties. Fully lined with leather and fabric. Counter area reinforced. Very good insole. Fiber counter, straight rear seam. Full toe piece of sharkskin. Leather heel. The outsole of leather was below average thickness, and of low wear resistance per unit thickness. **3**

Simplex Flexies (Simplex Shoe Mfg. Co., Milwaukee 1) \$8.95. Upper leather of good physical properties. Fully lined with leather and fabric. No reinforcements. Good insole. Fiber counter, tab-style rear seam. Full toe piece. Heel of medium wearing qualities. Outsole of leather of below average thickness, and of somewhat low wear resistance per unit thickness. **3**

Stride Rite (Green Shoe Mfg. Co., Boston) \$7.95 and \$8.95. Good physical properties for upper leather. Fully lined with leather and fabric. Reinforcing in toe cap area only. Cemented-type insole, considered weak. Fiber counter, tab-style rear seam. Full sharkskin toe piece, and scuff resistant upper leather of chrome retan. Heel of good wearing qualities. Outsole of leather of above average thickness, had rather low wear resistance per unit thickness. **3**

C. Not Recommended

Little Yankee (The Yankee Shoemakers, Division of Sam Smith Shoe Corp., Newmarket, N.H.) \$6.95. Physical properties of upper leather, somewhat below average. Fully lined with leather and fabric; leather portion in three pieces—sueded area at heel, considered undesirable. No reinforcements. Light standard insole. Fiber counter, straight rear seam.

Full toe piece of sharkskin. Heel of poor wearing qualities. Synthetic outsole of average thickness, but wear resistance per unit thickness in the lower range of the synthetic soles. **2**

Poll-Parrot (International Shoe Co.) \$6.98. Upper leather of good physical properties. Toe lined only over moccasin seam. No reinforcements. Light standard insole. Leather counter, no rear seam. Small toe piece of chrome leather—also rear of upper of same leather to form counter pocket. Heel of good wearing qualities. The outsole of synthetic material was below average thickness but of good wear resistance per unit thickness. This shoe would be rated *A* except for its being unlined; lack of lining considered undesirable. **2**

Proud-Fit (Albert H. Weinbrenner Co., Milwaukee 1) \$5.95. Upper leather of satisfactory physical properties. Fully lined with leather and fabric; leather portion in 3 pieces. No reinforcements. Stitchdown-type insole. Leather counter, straight rear seam. Full toe cap of chrome leather. Heel of good wearing qualities. Outsole of synthetic material, thinnest of group; wear resistance per unit thickness in lower range of synthetics. **2**

Storybook (Storybook Shoe Co., Division of General Shoe Corp.) \$5.95. Upper leather of fair physical properties. Fully lined with leather and fabric; leather portion in three pieces. No reinforcements. Stitchdown-type insole. Fiber counter, straight rear seam. Sharkskin toe piece below moccasin seam. Upper of scuff-resistant chrome retan leather. Heel of poor wearing qualities. Has arch built up with sponge rubber, held under sock lining, considered to be of no value. Outsole quite thin, and, for a synthetic, low wear resistance per unit thickness. **2**

Announcement to Consumers' Research Subscribers

AFTER careful consideration, the Board of Trustees of Consumers' Research has voted a moderate increase in the subscription rates of CONSUMERS' RESEARCH BULLETIN.

While for over 10 years we have maintained our monthly BULLETIN subscription rate at \$3 per year, the past few years have brought to CR, as it has to all other publications, steadily and substantially increasing costs of paper and printing, laboratory instruments, equipment, and supplies, products purchased for test, and charges by outside laboratories and consultants. We have sought to prevent a rise in the subscription charge by every practicable means, but the continuing and unavoidable accumulation of extra costs has made this impossible.

Effective October 1, 1955 the subscription rates for Consumers' Research monthly BULLETIN and Consumers' Research *Annual Bulletin* are to be as follows:

	Subscription Rates	
	U.S.	Add for Foreign
1 year New subscription for monthly Bulletin (12 issues).....	\$4.00	50c
1 year New subscription for monthly (12 issues) plus Annual Bulletin.....	6.50	50c
2 year New subscription for monthly (24 issues).....	6.50	50c
Annual Bulletin alone (subscribers).....	2.50	25c
Annual Bulletin alone (non-subscribers).....	4.25	25c
1 year Renewal for monthly (12 issues).....	4.00	50c
1 year Renewal for monthly (12 issues) plus Annual Bulletin.....	6.50	50c
2 year Renewal for monthly (24 issues).....	6.50	50c

We are announcing the new subscription rates two months in advance of the October 1 date. However, until October 1 we shall honor orders covering new subscriptions and renewals at the previous rates.

Tape Recorders

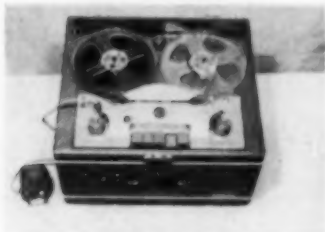
WHEN CR last tested tape recorders, almost three years ago, there were very few that were capable of recording a range of frequencies suitable for high-fidelity listening. A rule-of-thumb applied at that time limited the upper frequency cutoff of a recorder to 1000 times the tape speed in inches. Apart from that limitation, only very expensive recorders were sufficiently well designed to warrant purchase for use in high-fidelity systems.

Important improvements have been made recently, particularly in the design of the recording head, and several reasonably-priced tape recorders are now available which can be considered suitable for use in conjunction with good, but not the best, systems. It should be noted, however, that irrespective of claims for frequency responses from 40 or 50 to 12,000 to 15,000 cycles per second, none of the recorders tested exhibited performance up to such claims at a tape speed of $7\frac{1}{2}$ i.p.s. (inches per second). Presumably, some manufacturers refer to the capabilities of the recording head and the amplifier alone and do not intend that the narrower and obviously very limited responses of the microphone and speaker shall be considered. Regardless of these evident deficiencies, interest in tape recorders is at a high level, and the devices are in demand not only by high-fidelity enthusiasts but also by home movie fans (for dubbing in sound), and by professional people and others for the recording of interviews, diagnoses, laboratory observations and instrument readings, and hundreds of other applications.

If you have decided to purchase a recorder and must consider its cost, you should first decide what you will use it for, principally. A

recorder for use as an integral part of a high-fidelity reproducing system should not only provide good frequency response through its amplifier—50 to at least 10,000 or 12,000 cycles per second—but should have built-in provision for by-passing the amplifier-speaker system in the recorder so that your own good amplifier and speaker system may be used. If it is your intention to use the instrument primarily with pre-recorded tape, which is now being distributed in most areas, the microphone supplied will likely serve. On the other hand, if you intend to record live music at concerts and the like, you will probably have to purchase a new and better microphone. A microphone with a broad, flat frequency response and different directional qualities is needed. If you do not need a high-quality unit, you may achieve a substantial saving, both in cost and weight, with a less impressive and less costly recorder.

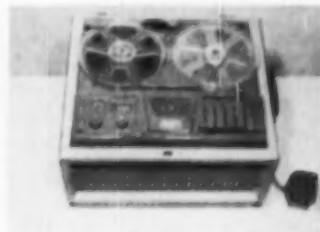
To help the prospective purchaser in making a choice, CR has tabulated several of the more important aspects and characteristics of the recorders tested (see Table I). It will be noted that tape speeds of $3\frac{3}{4}$ and $7\frac{1}{2}$ i.p.s. are common to all the units for which high-fidelity claims are made. The $3\frac{3}{4}$ i.p.s. speed is not wholly satisfactory for reproduction of music on any recorder, although it does provide a comparatively economical means for recording voice, which does not require as high fidelity of sound reproduction as, for example, does fine orchestral music. All of the recorders do provide for dual-track operation but, with the exception of the *Webcor 2110-1*, which had two recording heads, it was necessary to turn over the reel of tape



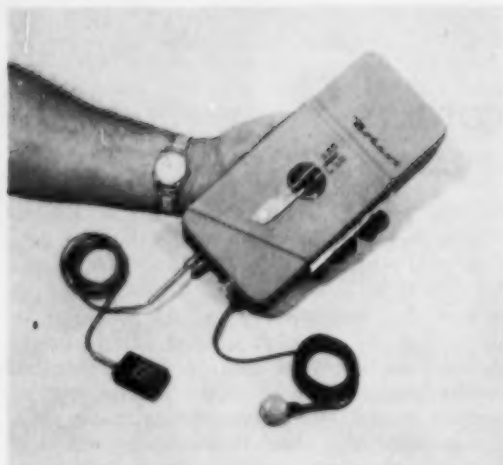
RCA Victor SRT 403



Crestwood 304



Ampco 757-T



Photograph showing relatively small size of Midgetape.

after a single track had been recorded. The change is not difficult but does take a little time.

Most of the recorders accommodate the 7-inch reel which at the $7\frac{1}{2}$ i.p.s. speed provides about 60 or 90 minutes of dual-track recording, depending upon the kind of tape used. A 7-inch reel will accommodate 1800 feet of the new thin Mylar-base tape (\$9.75) but only 1200 feet of the regular (\$5.50). The cost per foot for the two kinds is about equal. Both have their advantages and disadvantages.

Two methods, electronic and magnetic, were used to clean or "erase" a used tape. The electronic method employs an electric current, alternating at supersonic frequencies. The method is preferable because it does a better job of erasure and thus leaves less background noise on the tape. A permanent magnet or magnets can do a satisfactory job, however, and reduces the cost of manufacture of a recorder.

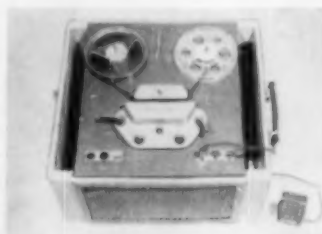
Each recorder employed a device called a "level indicator." This provides a visual signal

indicating when the electrical signal being fed to the recorder is too strong. A meter, often used on expensive professional-type recorders in the \$350 to \$1000 class, is preferable. A tuning-eye tube, used on the *Ampro*, *Pentron*, and *Webcor* models is next best. A neon bulb is least desirable of the three.

Most of the recorders tested provided for at least two input connections, one for the microphone, another for use when recording programs directly from a radio receiver. Separate inputs are needed because the microphone and radio must be "matched" to the recorder and different matching values are required. With a majority of the instruments, clip leads were furnished, to be attached to the voice coil connections on the loud-speaker of the radio. The other, and preferable method used in the *Bell*, *Crestwood*, and *Webcor*, requires a connection to the detector stage in the radio (volume control)—more trouble to carry out, but capable of far better fidelity of recording.

The loud-speaker or speakers in practically all of the recorders tested were quite definitely a limiting factor in regard to frequency response as heard by the listener. Realizing this, manufacturers provide an output connection so that an external speaker of better capabilities may be used if desired. Some also provide an output connection that permits an external amplifier and speaker to be used. The latter arrangement would be useful principally to the high-fidelity enthusiast who already has a first-class amplifier and speaker. If there is a likelihood that you will expand your facilities in that direction, you would be wise to purchase a recorder with the provision described.

Along with the loud-speaker, the microphone is likely to be a principal factor in limiting fidelity of reproduction. The microphones supplied with the recorders tested were either of the crystal or reluctance type. Higher-quality microphones of the dynamic, ribbon (velocity), and condenser types which cost considerably more



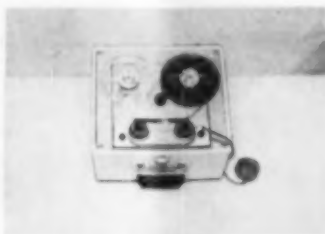
Bell RT-75



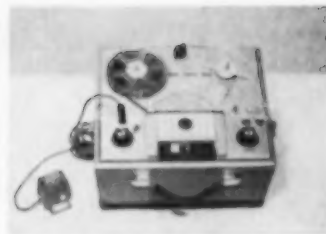
Revere T-700D



Ekotape 205



Telectro-Tape



Knight PR4-A-12

than a crystal or reluctance type, accept a wider frequency range and have a smoother response within that range. Simple substitution of one of the better microphones is seldom possible because the recorder is incapable of amplifying the low output sufficiently while maintaining a low noise level, and, in addition, lacks proper facilities for matching to microphones of the preferred kinds.

A comparison of crystal and reluctance microphones indicates that generally the crystal type has better frequency range and higher gain (greater sensitivity), but suffers from being susceptible to damage by a hard knock, and by conditions of temperature and humidity that are often encountered. The reluctance microphone is rugged by comparison, but its frequency response will be only fair, and it will be subject to hum pickup.

Some brief words of caution to users of recorders:

1. Store tape in erased condition if the recording is not needed.
2. Store recordings in a cool place.
3. Hold the microphone about 12 inches from the mouth.
4. Clean the recording and erase heads occasionally with a piece of cloth dampened with acetone or similar cleaning agent.
5. A crystal microphone may be seriously damaged or completely ruined if left in a closed

car in hot sunny weather or any other place where it may get very hot.

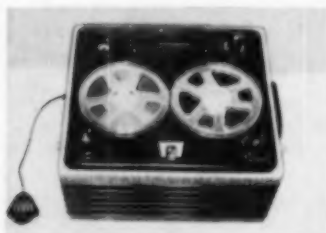
Since any portable recorder may be expected to be used out-of-doors, as on a patio, or porch, potential shock hazard of a recorder must be low. Leakage currents on the *Ampco 757-T* and the *Webcor 2110-1* were excessive, and dangerously so in the *Telectro-Tape*.

A. Recommended

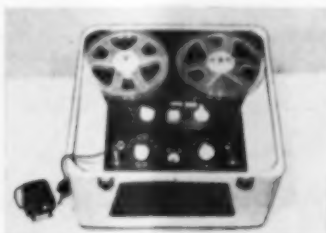
Crestwood, Model 304 (Daystrom Electric Corp., Poughkeepsie, N.Y.) \$199.50. 7 tubes, plus 2 neon indicators. Push-pull output, desirable type, two 6V6's, giving 10 watts output at 5% distortion. Rewind time for 600 ft. of tape, 1 min. 20 sec., satisfactory, but there was some tape spillage. Considered easy to thread. Push-key and lever controls were considered easy to use and were not unduly complicated. Speed change by an accessible lever arm (desirable). 2

Bell, Model RT-75 (Bell Sound Systems, Inc., Columbus 7, Ohio) \$225. 5 tubes, plus neon level indicator. Single-end amplifier output, 6V6, giving 3 watts at 7% distortion. Rewind time for 600 ft. of tape, 46 sec. Considered very easy to thread. Speed change by an accessible lever arm (desirable). Push-button and lever controls. 3

(Continued on page 16)



Webcor 2110-1



Pentron TR-4



Midgetape with a-c power pack on left and speaker-amplifier on right.

Table I—Summary

	Ampro 757-T	Bell RT-75	Crestwood 304	Elo/spe 205	Knight PR 4-A-12
Price, \$	274	225	200	225	100
Weight, lb.	37.5	38	33.5	29.5	24
Tape speeds, i.p.s.	q, r	p, q, r	q, r	q, r	q, r
Dual track	Yes	Yes	Yes	Yes	Yes
Maximum reel size, in.	7	7	7	7	7
Type of erase	Mag.	Elect.	Elect.	Elect.	Mag.
Level indicator	Magic Eye	1 Neon	2 Neon	1 Neon	2 Neon
Provision for monitor	Yes	Yes	Yes	Yes	Yes
Input, microphone	Yes	Yes—2	Yes	Yes	Yes
Inputs, radio, etc.	Yes	Yes	Yes	Yes	Yes
Program indicator	Counter	No	No	No	No
Output, Ext. Spkr.	Yes	Yes	Yes	Yes	Yes
Output, Ext. Amp.	No	Yes	Yes	No	No
Number of speakers	1	1	1	1	1
Type of microphone	Crys.	Crys.	Crys.	Crys.	Crys.
Muting of rewind	Yes	No	No	No	No
Remote control provision	Yes	No	No	Yes	Yes
Power consumption, watts	140	95	125	100	75
Aud. freq. range, low end	70	70	100	200	200
Aud. freq. range, high end	11,000	12,000	12,000	9000	9000
Amplifier range, low end	70	50	100	100	200
Amplifier range, high, up to	14,000	12,000	12,000	9000	9000
Speed, accuracy	g	g	g	g	f
Flutter	n	n	n	n	n
Wow	s	n	n	n	s

p—1½ i.p.s.; q—3¾ i.p.s.; r—7½ i.p.s.

g—good; f—fair; n—negligible; s—slight; Crys.—crystal; Rel.—reluctance; Mag.—permanent magnet; Elect.—electronic supersonic oscillator;

Aud.—audible; Ext.—external.

*Records and plays both tracks without need for reel turnover.

ta on Tape Recorders

Midgetape	Pentron TR-4	RCA SRT 403	Revere T-7000D	Telectro-Tape	Webcor 2110-1	
230	190	230	213	100	208	Price, \$
3.5	31.5	36	39	14	40.5	Weight, lb.
p	q, r	q, r	q, r	q	q, r	Tape speeds, i.p.s.
Yes	Yes	Yes	Yes	Yes	Yes*	Dual track
—	7	7	7	5	7	Maximum reel size, in.
Elect.	Elect.	Mag.	Elect.	Mag.	Elect.	Type of erase
None	Magic Eye	2 Neon	2 Neon	1 Neon	Magic Eye	Level indicator
No	Yes	Yes	Yes	No	Yes	Provision for monitor
Yes	Yes	Yes	Yes	Yes	Yes	Input, microphone
No	Yes	Yes	Yes	No	Yes	Inputs, radio, etc.
No	No	Counter	Counter	No	No	Program indicator
Yes	Yes	Yes	Yes	No	Yes	Output, Ext. Spkr.
No	Yes	Yes	No	No	Yes	Output, Ext. Amp.
1	1	3	1	1	1	Number of speakers
Crys.	Crys.	Rel.	Rel.	Crys.	Crys.	Type of microphone
No	No	Yes	Yes	No	Yes	Muting of rewind
Yes	No	Yes	Yes	No	No	Remote control provision
—	70	105	95	75	85	Power consumption, watts
—	300	70	100	200	100	Aud. freq. range, low end
—	9000	8000	12,000	4500	10,000	Aud. freq. range, high end
—	200	50	40	180	50	Amplifier range, low end
—	9000	8000	14,500	5000	10,000	Amplifier range, high, up to
g	g	g	g	g	g	Speed, accuracy
s	n	n	n	n	n	Flutter
s	n	n	s	n	n	Wow

RCA Victor, Model SRT 403 (Radio Corp. of America, Camden, N.J.) \$229.95. 5 tubes, including rectifier, plus 2 neon indicators. Push-pull output, desirable type, two 6AQ5's, gave 6 watts output at less than 5% distortion. Rewind time for 600 ft. of tape, 1 min. 30 sec., satisfactory. Considered easy to thread. Push-key controls easy to use. Speed change by an accessible knob. 3

* * *

Revere, Model T-700D (Revere Camera Co., Chicago 16) \$212.50. 5 tubes. Single-end output, 6V6, providing 3.5 watts at slightly less than 5% distortion. Rewind time, 1 min. 10 sec. Considered easy to thread. Both push-key type and knob controls used. Speed change, accessible lever. Selection located by counter, easily reset. Good features included excellent electrical frequency response, very clean erase (low noise level), ease of operation, and good mechanical design. 3

B. Intermediate

Knight, Model PR4-A-12 (Allied Radio Corp., Chicago) \$97.45, plus postage. A "private brand" tape recorder marketed by one of the largest mail-order radio-television supply houses. 4 tubes, plus 2 neon level indicators. Single-end output, 6AQ5, providing 2.5 watts at 5% distortion. Rewind time, 1 min. 33 sec. Considered easy to thread. Push-key type controls for tape motion, and knob controls for other functions. Speed change, accessible knob. Only fair speed stability; high noise level, and relatively low output power at satisfactory level of distortion were principal disadvantages. 1

Pentron, Model TR-4 (Pentron Corp., Chicago 24) \$189.50. 4 tubes, plus "magic-eye" level indicator. Single-end output, 6V6, providing 4 watts at 8% distortion. Rewind time, 53 sec. Considered easy to thread. Both knob and push-button controls used. Speed change, accessible knob. ¶A newer model, T-90, has been announced but was not available in time for test. 2

Ekotape, Model 205 (Webster Electric Co., Racine, Wis.) \$225. 6 tubes. Single-end output, 6V6, providing 3 watts at 5% distortion. Rewind time, 1 min. 25 sec. Considered easy to thread. Knob controls, simple to operate. Speed change by an accessible knob. 3

C. Not Recommended

Telectro-Tape Portable (Telectrosonic Corp., 35-18 37 St., Long Island City, N.Y.) \$99.50. 3 tubes, plus selenium rectifier. Knob-type controls, easy to operate. ¶The Telectro-Tape is not to be con-

sidered in the same class as the recorders previously listed, since it was not found suitable for even medium-fidelity reproduction of music. The single 3¾ i.p.s. tape speed available, together with the amplifier and speaker provided, served to limit frequency response to a range of 200 to 4000 c.p.s., which is fairly satisfactory for speech. Principal advantage of the Telectro-Tape is its light weight (see table on p. 14-15). Leakage current excessive and very dangerously so since in one position of line plug, microphone cord ground shield was at full line potential. 1

Ampro, Model 757-T (Ampro Corp., 2835 N. Western Ave., Chicago) \$274.45. 7 tubes, plus 2 selenium rectifiers (2 tubes are part of radio which is incorporated in this model). Single-end output, 6AQ5, providing 2.5 watts at 5% distortion. Rewind time for 600 ft. of tape, 1 min. 12 sec., satisfactory. Considered easy to thread. Push-key controls, simple to operate. Speed change by an accessible knob. Selection located by counter, easily reset. Leakage current, an indication of shock hazard present, 1.5 ma. Considered hazardous, especially since leakage was present at metal case of microphone. Would otherwise have received an A-Recommended rating. 3

Webcor, Model 2110-1 (Webster-Chicago Corp., Chicago 39) \$207.50. 6 tubes, including "magic-eye" indicator. Push-pull output, desirable type, two 6V6's, providing 5 watts output at less than 3% distortion, very good. Rewind time for 600 ft. of tape, 1 min. 55 sec., satisfactory. Only recorder tested which provided desirable dual-track recording and playback without reel turnover; 2 recording heads and 2 motors were used. Considered easy to thread. Multiple-knob and push-button controls, satisfactory. Speed change, by slotted knob for coin or screwdriver (somewhat inconvenient). Leakage current, 2.0 ma. Considered hazardous since the leakage was present at the metal case of the microphone. Would otherwise have received an A-Recommended rating. 3

Small battery-operated recorder

A. Recommended

Midgetape (Mohawk Business Machines Corp., 944 Halsey St., Brooklyn 33, N.Y.) \$229. Extra batteries, \$11.50. A.c. power converter (to run Midgetape instead of battery), \$33.50. Foot control (for transcription purposes), \$35. External amplifier with 2-in. speaker, \$35. Useful mainly as a portable instrument which can be readily transported (very light weight) and operated anywhere on self-contained batteries. Manual tape rewind; good erase characteristics. Produced good clear speech when used properly. Suitable for dictation and transcription, with accessories available. It would have been preferable if the power converter unit replaced both A and B batteries rather than the A-pack only.



Spinet Pianos

DURING the last 20 years, the once popular upright piano of large size has disappeared from the scene and now survives only as a sort of poor relation. Professional pianists and other musicians of like standing continue to use the grand piano almost exclusively, because of its vastly superior musical capabilities; but the domestic piano of today is the spinet, that is to say the upright piano that stands from 36 to 42 inches from the floor.

The name "spinet" applied to these little pianos is in reality a misnomer. It was originally used to describe the small rectangular harpsichords of the seventeenth and eighteenth centuries, which obtained their sounds by plucking, instead of striking, their strings. The name itself was presumably taken from the Italian *spinetto*, which signifies thorn, for the plucking mechanism often made use of thorns taken from rose and other bushes to excite the very thin strings.

The large upright piano that ceased to be produced some 25 years ago during the depression of the 1930's, when piano buying almost completely stopped, was often a very fine musical instrument, but as a piece of domestic furniture it was often ugly to the point of being a monstrosity. The inspiration that led to the design and construction of an entirely new type, small enough not to dominate the space available in a modern living room, and lending itself to the most artistic treatment, had an extraordinary effect. The first specimens introduced rather less than 20 years ago took the country by storm. The nation, just recovering from the horrors of a great depression, took to the beautiful little new pieces of musical furniture so enthusiastically that within a year the old-fashioned high upright had become obsolete. From that day to the present the "spinet" fashion has

flourished. The annual output of pianos during the last five years or so has averaged almost 160,000 units, of which only about one in 30 has been a grand. Such are the facts of recent piano history.

The spinet piano as a musical instrument

The piano is a *stringed* instrument, which obtains its sounds from the vibrations of steel strings struck by felt-covered, pivoted mallets called "hammers" actuated by a mechanism that is itself actuated by the player's fingers. The player is in fact "playing on the strings," but by one step less directly than does the harpist.

Now the musical efficiency of the sounds produced by strings, whether bowed, plucked, or struck, depends upon certain well-known physical laws. These relate to (1) the vibrating length, (2) the weight per unit of length, (3) the tension set up when the string is tuned to the proper pitch, (4) the nature of the material of which the hammer is constructed (felt, wood), and (5) the nature of the blows inflicted upon the string by the player, using the mechanism that he controls through his fingers.

By themselves, of course, the strings would emit only feeble sounds, but these are taken up and amplified by the soundboard, a sheet of suitable wood which repeats the vibrations of

Consumers' Research gratefully acknowledges the aid and counsel of Dr. William Braid White, Principal of the School of Pianoforte Technology, Chicago, Ill., for his helpful assistance to CR's staff in the preparation of this article.

the strings on a larger scale, transforming them into the powerful and musically beautiful output that we associate with the finer pianos.

Now, how do these physical facts affect the musical value of the small spinet piano, which, as one can see by mere inspection, contains all the features of the old large upright, from which it differs only in its physical dimensions?

Effects of small size

The first difference is to be found in this very matter of size. The tonal output of the spinet's strings depends upon three of the above-mentioned factors: (1) vibrating length, (2) weight per unit of length, and (3) tension, or the stretching force required to bring each string into tune. Inspection of the scale of strings in any piano, from the largest grand to the shortest "spinet," shows that the vibrating lengths available for the strings are virtually identical between the middle of the keyboard, or what we call "middle C," and the extreme treble four octaves higher. The entire scale of strings must be laid out according to certain fixed proportions of length to pitch, and it can be shown that between middle C and the extreme low bass, these proportions cannot be carried out correctly beyond a point lower than about the E below middle C. That simply means that a spinet standing say 40 inches above the floor must have the strings that run below the E mentioned down to the end of the bass, shorter than correct proportioning would call for. This lack of length must then be compensated by increasing the weight of each successive bass string; and since the relation of weight to pitch is more remote than that of length to pitch, the weight must be, so to speak, added on more rapidly than length is taken off. This again means that the balance of the physical factors of the string or strings is disturbed, and the tonal output affected for the worse.

The second difference lies in the fact that the soundboard of a piano varies in area according to the dimensions of the instrument. Thus a concert grand of nine feet over-all length will have a soundboard covering an area of perhaps 2000 square inches for each of its two surfaces. Here is a vast apparatus of resonance, capable, when stirred up by the strings, of an extremely powerful sound output. On the other hand, the area of soundboard of a spinet standing 40 inches in height from the floor will not exceed one-half the amount mentioned. Apart then from all considerations of the lengths of the strings in the lower half of the scale (below middle C), the restricted area of the soundboard will, itself, reduce the resonating efficiency of the spinet piano,

especially through the bass region. To some slight extent, this difficulty can be ameliorated by better design, leading to more sensitive response; but the net gain by these means is likely to be small.

Action

Pianists accustomed to the keyboard and action of a grand piano often complain that the "touch," as it is usually called, of a spinet piano feels "sluggish," calling for undue physical effort of fingers and hands. It is, of course, well known that the upright instrument, no matter how tall it be, or how accurately its bass strings may be scaled, never gives to the player that feeling that he is, so to speak, drawing out the tones from the keys, which he experiences when playing a large and beautifully adjusted grand. Undoubtedly the complaint has substance. The strings of a grand piano run parallel to the line of the keys and immediately above them, so that the hammers, which by striking them produce the sounds, lie between the other two elements, and parallel to both. Thus, when a hammer on a grand piano strikes a string, and rebounds to its position of rest, it is assisted by gravity. On the other hand, the strings of an upright piano are placed vertically, and the hammers must take a corresponding position. This fact tends to make their rebound somewhat sluggish, so that their return movements must be assisted by springs. The upright's action is therefore less sensitive than that of the grand, and besides does not possess the real but rather subtle refinements that go with the latter.

In the case of the spinet, these inherent disadvantages are somewhat emphasized. For one thing, the reduced physical dimensions require that the action shall also be made more compact. In the very small models (less than 40 inches in height from the floor), the positions of some of the parts must even be altered, involving what is known as the "drop action." The use of this type of action does not necessarily render playing a more laborious operation, but it does inevitably introduce frictional resistances that are somewhat disturbing to the player accustomed to a grand piano.

Spinet and grand pianos

Strictly as a musical instrument then, we must conclude that the spinet piano is, neither tonally nor mechanically, an improvement over the grand piano or over the old-fashioned, and now obsolete, large upright. On the other hand, one cannot deny that it lends itself to beautiful treatment, and is far superior in appearance to the uprights of 30 years ago.

Pianos built for the use of professional pianists and especially for the great artists of the keyboard, are invariably what are called "grands," that is to say are built with their strings parallel to their keyboards and in lengths ranging from 5 to 9 feet overall. The last named are the special instruments of the great pianists. There is no mystery about it. If a piano is to produce a tonal output of the highest quality, it must be fitted with a scale of strings scientifically balanced. This cannot be managed, certainly so far as the bass of the scale is concerned, within the limits of dimension possible to the spinet. In other words, here is a definite set of physical limitations that cannot be overcome save perhaps by a drastic change of shape. Thus, if the outline of the case were changed so that its appearance should be rather like that of a harp, with one end higher from the floor than the other, the bass strings could be made sufficiently long to give the desirable balance with the rest of the scale. Such a change need not involve any loss of architectural beauty. No serious attempt has yet been made by piano makers to create such a design.

Selection

The matter of selecting a spinet piano depends upon the answers one gives to the following questions: (1) Am I buying a piano primarily for its value as a musical instrument, in which all other qualities are subordinated to its tonal output? or (2) on the other hand, do I mostly desire in a piano its beauty, and its suitability as furniture, to harmonize with the other furnishings of the room?

Most buyers of pianos are certainly not trained musicians, nor is it to be expected that they will be. It is quite certain that the spinet piano, speaking generally, does satisfy the requirements of the very large majority of those who buy pianos nowadays. Although it is inferior, musically, to both the grand piano and the old-fashioned large upright, its musical deficiencies are almost certain to be ignored by a very large majority of those who buy one of the various makes and models of spinets. Furthermore, the modern "spinet" piano can be, and usually is, of pleasing design as furniture.

It must be acknowledged, however, also that, as with every manufactured product, there exists among those who make it widely differing ideas as to levels of workmanship, choice of materials, accuracy and finish of what may be called the engineering design.

Considering all the circumstances, one is driven to realize that cost comprises as good a standard for selection as can be found for those

buyers who are interested in selecting an attractive piece of musical furniture. The better woods, such as mahogany, and cases that are well finished will, of course, be more attractive in appearance and possibly be given preference over a good instrument in a simpler case. It is believed that most pianos are bought today less for their musical performance than for other considerations such as price and physical beauty. Speaking in an approximate sense, the safest rule, in the absence of advice from an expert pianist on the particular instruments being considered, is to pay the highest price one can afford to pay in buying a piano of a maker of standing and good reputation.

Three tests for tonal output

There are, however, some more or less objective tests whereby a judgment as to the tonal output of a spinet piano may be arrived at. One may fairly well rely upon the results of these tests, that may be made by anyone who possesses a good sense of tone quality and keyboard "feel."

1. At or about the tone E just below middle C on the keyboard, the piano maker is obliged to increase artificially the weights of the successive strings running down into the bass, by spinning soft copper wire over them. At this point of the scale of the piano, one is very likely, indeed almost certain, to notice as one runs one's fingers up and down over the keys a rather sudden change in the "quality" or (as some would say) the "color" or timbre of the successive sounds. The bass section of the instrument seems to have a definitely different, and on the whole less pleasing, effect on one's ear. The technical problems involved in eliminating this "break" (as it is usually called) in the tonal output engage the careful attention of all good piano makers. If, as one runs over the keyboard, one notices very little "break" in the tonal output at the critical point mentioned, then one may feel sure that the piano has been carefully and skilfully designed and built. The converse of this broad statement is also true.

2. The stretched strings from which a piano derives its tones possess one very remarkable property, to which is due much of their tonal beauty. This is the power to give out what are commonly called "overtones" (more accurately "harmonics"), accessory sounds that arise from within the strings, which, while not changing their pitch, do affect their "quality," or, as it is sometimes called, their "color." A sensitive musical ear can detect these peculiar properties of piano strings and form its judgments as to the

beauty of the piano's tonal output, from the effect they have upon his ear. A prospective buyer would be well advised to obtain the services of an expert piano technician in this matter, and take his advice as to the harmonic properties of the strings of a piano that he is expecting to buy.

3. The satisfaction, or its opposite, that the possessor of a piano obtains from playing it, depends also upon what is usually called the "responsiveness" of its "action," which is the mechanism that, intervening between the keyboard and the strings, conveys the musician's finger movements to the hammers that strike the strings. This action or string-exciting mechanism is a highly complex piece of delicate machinery, and the over-all quality of any piano depends upon its functioning. It is not easy to describe in words exactly how such efficiency may be measured by the non-expert; but it may help to say that a perfectly adjusted action gives to the player the feeling that the sounds are produced easily and naturally from the fingers sweeping over the keyboard, with no feeling that one is manipulating—as in fact one is—a complicated mechanism. If the player feels that he is obliged to exert conscious and obvious effort in order to excite the strings into satisfactory sound, he may be sure that he will be wise to look for a better instrument. Here also the technical advice of a well-trained piano technician can be invaluable.

The suggestions given in the course of this article are intended to provide such guidance as may be both intelligible and acceptable to the non-expert. With them in mind and, if possible, with the expert advice of a trained piano technician (which may nearly always be had), no intelligent man or woman need feel that he or she must rely upon either ignorant guesswork or the possibly overenthusiastic arguments of aggressive salesmanship. The study and use of the tests that have been outlined are recommended to all who desire to select wisely one of the modern small vertical pianos for a modern home.

The following listings are of spinet pianos which range from 36 to 41 inches in height above the floor. Grand pianos and special models for professional and school use are not included. The prices have been taken from retail price lists supplied by the manufacturers. They are not exact in all cases, owing to local circumstances, nor are they to be taken as permanently valid, for prices are subject to change, although usually within fairly narrow limits. Listings are in alphabetic order within the two groups.

A. Recommended

Baldwin (Acrosonic), Style 929 (Baldwin Piano Co., 1801 Gilbert Ave., Cincinnati 2) \$1064.

Chickering (Chickering & Sons, Division of Aeolian American Corp., East Rochester, N.Y.) \$990 to \$1230.

Knabe (William Knabe & Co., East Rochester, N.Y.) \$1040 to \$1320.

Mason and Hamlin (Mason & Hamlin Co., Division of Aeolian American Corp.) \$1290 to \$1577.

Sohmer (Sohmer & Co., Inc., 31 W. 57 St., New York 19) \$975 to \$1295.

Steinway (Steinway & Sons, 109 W. 57 St., New York 19) \$1475 to \$1730.

B. Intermediate

Cable (Conover-Cable Piano Co., Oregon, Ill.) \$595 to \$820.

Cable-Nelson (Everett Piano Co., Division of Meridan Corp., South Haven, Mich.) \$495 to \$695.

Everett (Everett Piano Co., Division of Meridan Corp.) \$745 to \$945.

Fischer (J. & C. Fischer, Division of Aeolian American Corp.) \$828 to \$905.

Gulbransen (Gulbransen Co., 2050 North Ruby St., Melrose Park, Ill.) \$525 to \$820.

Hardman (Hardman, Peck & Co., 33 W. 57 St., N.Y.C.) \$870 to \$1165.

Harrington (Hardman, Peck & Co.) \$725 to \$765.

Ivers and Pond (Ivers & Pond Piano Co., 2718 Pershing Ave., Memphis, Tenn.) \$850 to \$1045.

Janssen (Janssen Piano Co., Inc., 273 E. 23 St., N.Y.C.) \$595 to \$895.

Jesse French (Jesse French & Sons, Division of P. A. Starck Piano Co., 234 S. Wabash, Chicago) \$645 to \$905.

Kimball (W. W. Kimball Co., Kimball Hall, Chicago) \$595 to \$965.

Kranich and Bach (Kranich & Bach, 237 E. 23 St., N.Y.C.) \$935 to \$1095.

Lester (Lester Piano Mfg. Co., Inc., Lester 13, Pa.) \$535 to \$1028.

Mini-pianos (Hardman, Peck & Co.) \$595 to \$795.

Poole (Poole Piano Co., 2718 Pershing Ave., Memphis, Tenn.) \$565 to \$775.

George Steck (George Steck, Division of Aeolian American Corp.) \$828 to \$905.

Story & Clark (Story & Clark Piano Co., 64 E. Jackson Blvd., Chicago) \$675 to \$1195.

Winter (Winter & Co., Inc., 863 E. 141 St., New York 54) \$525 to \$895.

Wurlitzer (Rudolph Wurlitzer Co., DeKalb, Ill.) \$437 to \$795.

Built-in Kitchens

THERE ARE fashions in appliances just as there are fashions in clothing. The current trend, which is the subject of much discussion in manufacturing and trade circles and is attractively presented with an abundant variety of color photographs in home magazines, is "the built-in kitchen." Architects report there is a new tendency to emphasize the kitchen as a combined working and living area of a house. Appliances which are built into the walls or installed in cabinets give a greater flexibility to the designer in planning an attractive kitchen, permitting the use of a wider variety of materials, new surfaces, color, texture, and equipment. The convenience of having an oven, refrigerator, and freezer placed in the wall at waist height in order to save the homemaker from stooping and bending to use these appliances is a feature of built-in appliances. Instead of a wide range which takes up space and sticks out into the room, cooking units can be recessed into the wall to be folded down for use, or placed in counter work surfaces, using such materials as copper, stainless steel, and colored enamel for decorative effect, with knotty pine for the background.

Although some manufacturers are approaching the new fashion cautiously, several have gone all-out and consider it one of the greatest developments of the century in providing the appliance industry with something new to sell, and something to make current appliances look out of date.

The built-in appliances at the present time are to be considered as architectural units, rather than separate appliances. It has been estimated that about 85 percent of the sales of built-in ranges, for example, are made to builders and not to homemakers individually. Since built-in appliances require special construction for satisfactory operation, it is probably best to have them purchased by builders of new homes, for they present rather difficult and technical problems in proper installation and venting. One designer has estimated that in building a \$15,000 house the use of built-in kitchen equipment will add 15 percent more to the cost of the house for the structural provisions necessary for built-in equipment, as compared with free-standing appliances. The use of built-in appliances also requires a high degree of skill in installation for satisfactory performance and a

good plan of integration so that the working units will be placed where the user finds them most convenient. Wiring and plumbing are complex and require extremely competent and experienced workmen for best results.

Engineers in the field are quick to point out that there is nothing essentially new in the built-in devices. The Dutch ovens in which baking was done in large quantities in colonial days are still seen as curiosities in old homes. In more recent times the dishwasher is considered to have been the first modern built-in appliance.

The use of built-in equipment may not be practical for those who expect to move frequently or before they have an opportunity to secure a complete return on their investment. One designer suggests that a life of 7 years is long enough for any appliance for both safety and from the fashion point of view. With respect to the free-standing appliances, a life of 10 years is generally given as the expected length of service. For those who may have to plan on moving to another home, there is another type of appliance called the "stack-on" in the trade, which involves the use of units set on cabinets such as an electric oven mounted on a cabinet or a cabinet especially wired for a certain number of outlets including hot plates, cords for plugging in rotisserie, electric frying pan, toaster, and coffee maker, that lends itself more readily to moving, and to installation in other locations.

From the practical standpoint there is still much to be done to perfect the satisfactory operation of the so-called built-ins. The consumer needs clear, simple directions for proper care of these new appliances. Servicemen need specific diagrams on how to take care of breakdowns, and the devices should be constructed for servicing from the front so that portions of the kitchen will not need to be torn down in order to make repairs. At the present time the cost of installation is high, although prices are expected to come down if the trend takes hold so that the units are turned out in large numbers, and if there is a satisfactory degree of standardization on the types and sizes of the cabinets used. It is expected that for the time being the mass market will be in "stack-ons."

Whether the attempt to glamourize the kitchen will be highly successful is questioned by a group who wonder whether women really

want to spend most of their day in the kitchen no matter how attractive it is. In the new, small, low-cost houses it is, of course, cheaper to make the kitchen-living room one area separated by low dividers that provide counter tops, cupboard space, etc. The woman who is planning a kitchen based on the use of certain built-in appliances should give considerable study to the placing, position, and height of the

various units for her personal taste and convenience, and will need to decide whether the color or materials from which they are made is something she will want to live with for 7 to 10 years. She should also check whether she has available competent servicemen who will give her prompt and efficient repair service, in case something goes wrong with the range, the refrigerator, or the built-in gas or electric oven.

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Gas-Fired Automatic Water Heaters—I

IT has been estimated that the American public heats over 20 billion gallons of water every day of the year. In supplying the fuel for this tremendous demand, *gas* now leads over *electricity* and all *other fuels combined* in a ratio of about 3:2:1. A large part of the popularity of gas is due to the simplicity and convenience, and particularly the economy of gas-fired automatic storage water heaters. The total sales of water heaters are estimated to run over 400 million dollars a year, and with the increasing use of automatic laundry and dishwashing equipment, water heater sales are likely to continue their rise. There is a marked increase in the size of water heaters for home use. Whereas 20 gallons sufficed 15 years ago, today's heaters run 30 to 40 or more, and a 50-gallon or larger tank is indicated where an automatic washer will be used (automatic dishwashers, however, are not so serious a problem as automatic washing machines, which use about four times as much hot water per load). A shower may take about 15 gallons; an automatic clothes washer from 10 to 30 gallons per load; a dishwasher 3 to 8 gallons per load.

There are nearly 24 million water heaters altogether in use in American homes. About 60 percent of the heaters now being sold are said to be gas fired, with the total running now to well over 2 million a year.

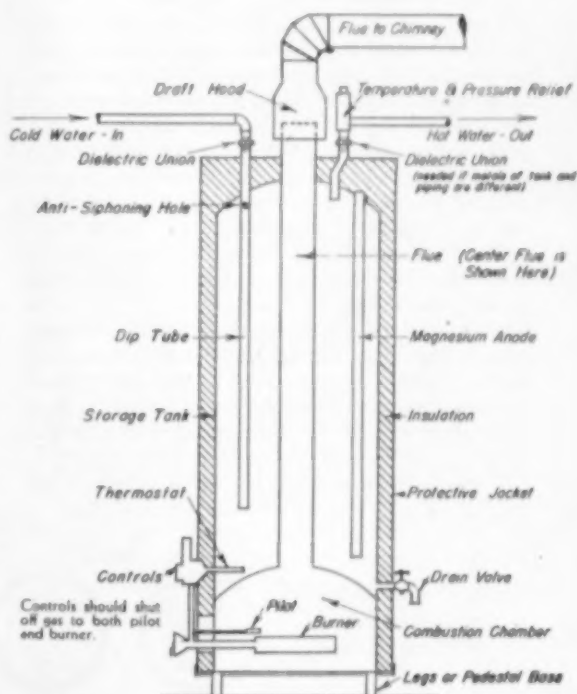
The requirements of the American Gas Association, with which all gas heaters of substantial merit comply, plus highly competitive sales, have resulted in a high degree of standardization in appearance and construction.

Essentially, a gas storage water heater is a self-contained system which includes a storage tank, usually of 20 to 75 gallons capacity; a layer of insulation surrounded by a protective and decorative thin metal wall or jacket; either internal or external flues to carry the hot gases of combustion over the water heating surfaces; a burner-pilot assembly; and suitable safety and thermostat controls. The general arrangement of these components is in most cases so stereotyped that the thickness and quality of materials, details of construction, and workmanship are often the only factors that provide a useful basis for discrimination between makes. For example, a majority of manufacturers offer at least two grades of gas water heaters; a conscientiously constructed unit primarily in-

tended for sale direct to the owner who is interested in optimum service and long life of his equipment, and a "trade" model for the speculative builder who is interested primarily in first cost and who may, unfortunately, often be willing to sacrifice even certain elements making for safety in order to secure the lowest possible price.

Storage tanks

The bodies of the heaters, the storage tanks, are now available in several materials including galvanized steel, porcelain-enameled steel (usually called "glass lined"), copper, monel metal, and aluminum alloy. Despite wide claims for the porcelain-enameled and non-ferrous tanks, well-built galvanized tanks can be safely guaranteed for 10 years and depended upon even for much longer with many water supplies, especially if protected from corrosion by sacrificial anodes (see CR BUL., May 1953, and discussion to appear in a forthcoming article). Except in areas



Gas-Fired Automatic Storage Water Heater

where the municipal water is unusually active in causing corrosion, and where, therefore, special types of tanks are thus advisable, the so-called "heavy-gauge" galvanized tanks rather than tanks of copper or other expensive materials are usually bought, and are found economical.

The quality of the galvanizing of tanks varies widely. Cheap tanks may be made of pre-galvanized stock, which leaves unprotected the areas that are subjected to pressure and bending by factory tools. The accepted high-quality method of galvanizing is the "hot dip" process in which the fully fabricated tank is immersed in a vat of molten zinc so as to cover thoroughly all cracks and crevices and thus to provide maximum protection. This process is so far superior that manufacturers who use it feature the words "hot dip" in their literature; the consumer should be wary, or at least check, any such ambiguous terms as "galvanized by special process" or the simple word "galvanized."

Porcelain-enameled tanks are offered to the uninitiated as an absolute guarantee against corrosion. Actually, these tanks, which are coated inside with a glassy material like that used on enamelware cooking utensils, are not corrosion-proof, principally because of processing difficulties and the human element which combine to make it almost impossible to turn out each and every tank without the occurrence of a few minute unprotected areas. In fact, one very reputable manufacturer of porcelain-lined tanks estimates that up to 8 square inches may remain unprotected due to such factors as imperfect preparation of the metal, air pockets and bubbles, and unavoidable uncertainties in production routines or in handling. In practice, corrosion tends to concentrate at unprotected points to shorten tank life materially. Thus it may take only a few defects of small size to bring about early failure of a tank through corrosion. Such tanks are not guaranteed for any longer period than the life of the better galvanized tanks. If they were as good as the advertising implies they are, it would be logical to expect that they should be guaranteed for a much longer period of time than galvanized tanks.

Copper, being too low in tensile strength for

normal construction, is usually used only as a protective lining for steel tanks. It is resistant to corrosion by the water of most areas, although it is well to make inquiries, as there are some notable exceptions where the water will cause corrosion damage to copper piping and tanks. Copper is sufficiently toxic to make it inadvisable to drink or cook with water that has been heated in a copper tank; cold water should be used instead for drinking, and cooking, and making hot beverages. (See "Choice of Water Piping for the Home," CONSUMERS' RESEARCH BULLETIN, March 1954, page 27.)

Monel metal is satisfactory in resistance to corrosion but, like copper, it is expensive. As with copper, it would be best to avoid using hot water from the tank for drinking or cooking.

Flue location

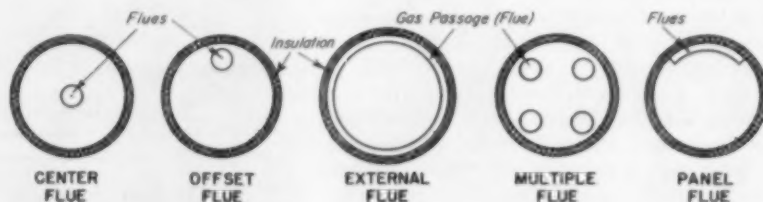
There are several popular schemes for leading the hot gases of combustion past the tank walls to the chimney (see Figure 1). Proponents of the external flue point to the greater tank surfaces swept by the hot gases, while manufacturers who favor internal flues are likely to feature the compactness that results from decreased over-all heater diameter. In one series of tests (cited by a manufacturer with an offset-flue design), efficiencies of 57 percent were claimed for offset flues; 52 percent for center flues; 51 percent for a complete outer flue; and 48 percent for a partial outer flue (panel type). Except for the offset-flue type, which gave an appreciably higher efficiency, the difference between the various flue designs is judged too small to justify a preference for one type over the other.

Chimney essential

All models burning over 5000 Btu per hour, or in other words capable of producing over three gallons of water per hour raised 100°F in temperature (for example, from 50° to 150°), including table-top and cabinet types, *must* be connected to a suitable chimney and *must* include a protective draft hood of a design approved by the American Gas Association. Installations not so connected are not only extremely hazardous but are also in direct violation of the codes

Figure 1—Flue Locations in Various Types of Water Heaters

Sketches Show Horizontal Cross-Sections of Heaters



of both the American Gas Association and the National Board of Fire Underwriters.

Safety valves

Missing from many models as offered for sale are the very necessary protective *relief valves* to guard the tanks from both excessive temperatures and dangerously high water-pump pressures that can cause a disastrous explosion if something should go wrong. This is particularly likely to be a problem with home water systems, but the safety device is necessary on all gas and electric water heaters, and as a combination control is available for temperature-pressure protection at a cost well under \$10, it is wholly unwise ever to omit one from any service water installation, either old or new.

Controls

There are numerous differences in the construction and arrangement of heater controls, but the most important is the degree of safety provided. In the really effective control systems, extinguishment of the pilot automatically shuts off all gas to both the main burner and the pilot; this makes the unit safe whenever the pilot light goes out. In contrast, some models, particularly those in the cheaper, or speculative builders' bracket, merely shut off the gas to the main burner while leaving that to the pilot flowing and unlighted. With liquefied petroleum gases (bottled gas), this can be very hazardous because this gas, being heavier than air, tends to accumulate at the level of the cellar floor, creating an extremely dangerous explosive mixture. A.G.A. codes and manufacturers recognize this and provide that the doubly-safeguarded control shall be used *when it is known that the heaters will be used with liquefied petroleum gas*; but makers cannot be certain which gas will be used in over-the-counter sales and conversions. Although with manufactured and natural gas the continued flow at the pilot burner is not so hazardous (though there have been numerous instances of flash explosions and burns from attempts to light heaters full of such gas), the risk should not be taken, and the safer type of control (which cuts off both main burner and pilot burner gas) should be used. The difference in cost between the two types of controls is only about \$5, and it is hard, therefore, to justify use anywhere of the less safe type of control.

Recovery rates

An outstanding advantage of gas-fired water heaters is their rapid replenishment of the tank with hot water, as compared with electric water heaters. For instance, all models of gas heaters

included in this study are capable of re-heating a full tank (30 gallons) in from 45 to 95 minutes. Even so, the slower models were purposely designed and offered as "slow recovery" models (as the slower-heating appliance uses gas more economically). On the same basis, coal-fired water heaters would require 3 hours and electric storage water heaters 6 hours or even more (except some electric heaters of a kind just developed and now being marketed for the first time).

The practical result of the rapid recovery of the heat supply in a gas water heater is that a considerably smaller tank will serve with gas than with either coal or electricity. A heater with a 1-hour recovery rate is capable of supplying two tanks full of hot water in 1 hour; namely, the one available at the beginning of the drawoff and the one heated during the hour.

Sizing of heaters

Starting with a 30-gallon tank, which is the smallest recommended for satisfactory service and operating economy, the accompanying table gives the sizes approved and recommended by the American Gas Association, the Gas Appliance Manufacturers' Association, and numerous gas utility companies.

Table I. Size Recommendations for Automatic Storage-Type Gas Water Heaters

Number of Bathrooms	Number of Bedrooms	Minimum Tank Size
1	1 or 2	30 gal.
1	3 or 4	40 gal.
2	2 or 3	40 gal.
2	4 or 5	50 gal.
3	3	50 gal.
3 or 4	4 or 5	75 or 100 gal.

If the use, later on, of an automatic clothes or dishwasher is contemplated, use the next larger tank size.

Automatic washing machines require 10 to 30 gal. in $\frac{1}{2}$ to 1 hr.; many dishwashers require hot water at the rate of $1\frac{1}{2}$ to 2 gal. per min. or 3 to 8 gal. per load.

It is best not to install a tank of inadequate capacity for the sake of a somewhat lower initial cost. (Approximate average price of a 30-gallon water heater is \$130; 40-gallon, \$150; 65-gallon, \$205; 75-gallon, \$250.)

* * *

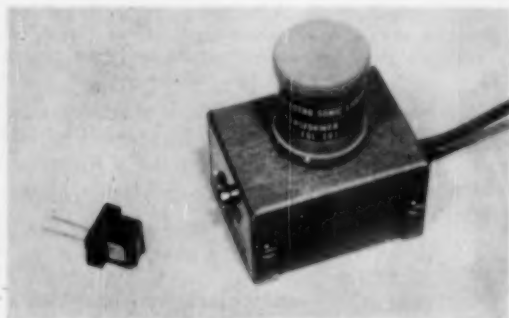
Editor's Note

Part II of "Gas-Fired Automatic Water Heaters" which rates 23 brands will appear in the September issue.

Phonograph Pickup Cartridges

IF YOU ARE in the market for a high-fidelity phonograph or intend to build your own high-fidelity system, it will be to your advantage to become acquainted with various types of phonograph cartridges. Two well-known kinds of cartridges which are offered for use in high fidelity are the magnetic type, and the newer ceramic cartridges.

The magnetic type, which has been accepted prior to this time as the standard for high fidelity, is actually a miniature electrodynamic generator. In essence, it consists of one or more tiny coils of very fine wire, assembled with a permanent magnet. The magnet produces a magnetic field (flux) which passes through the coils and a small air gap. Movement caused by the stylus following the grooves of the record changes the magnetic field, thus inducing a current flow in the coils. This current flow is proportional to the rate of change of the magnetic field (flux) which has been caused by the speed at which the stylus is moved to and fro. Since their current output is caused by the rate of lateral movement rather than by the distance the stylus is moved, these cartridges are known as the constant velocity type. Because of this constant velocity characteristic, a magnetic cartridge does not produce the same output level for the various tones (frequencies) in the audible frequency range, and in order to obtain a fairly even response from the magnetic cartridges at different frequencies recorded by the grooves on the record, *equalization* in the form of special circuits must be employed and is often selected by a knob or a series of push buttons.



Electrosonic ESL-121 cartridge at left. Required step-up transformer is at right.

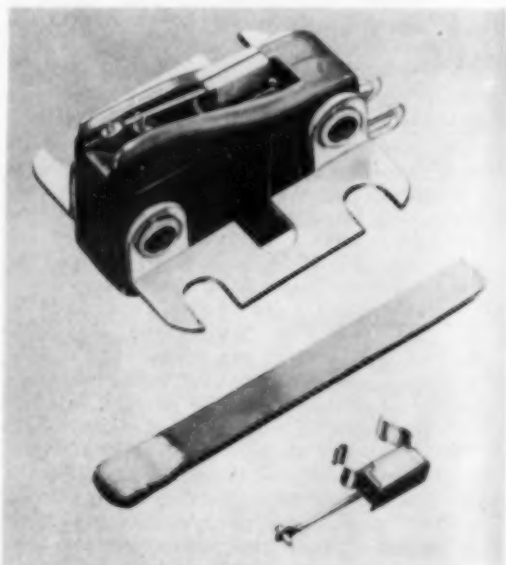
The output of a magnetic cartridge is very low, and an extra stage of amplification is necessary to make the output signal usable. The preamplifier is high gain and susceptible to picking up noise and hum. The magnetic cartridge itself is susceptible to hum from phono motors and stray a-c fields. For this reason, only phono motors of the 4-pole type or the far more expensive hysteresis-synchronous type should be used with magnetic cartridges. Also, if the preamplifier used is not of correct design, the good performance of which a magnetic cartridge is capable may be offset to a great extent by the extra noise and hum it introduces into the system.

Because of its higher output voltage, the ceramic cartridge does not require a preamplifier; neither does it require equalization. In addition, the ceramic cartridge picks up no hum and undesirable noises because it has no magnetic circuit of its own. Ceramic cartridges are made of barium titanate, a material similar to that used for the making of dishes, cups, and other similar items. When this material, after proper processing in manufacture, is subjected to a varying mechanical stress such as would be produced by a needle (which is mechanically fastened to the ceramic element) riding in the phonograph record groove, the output consists of a voltage having a varying frequency which conforms to the varying frequency of sounds represented by the record groove variations. The farther the needle moves to left and right, the higher the output voltage. Ceramic cartridges are of the constant amplitude type (respond to distance of needle movement), rather than the constant velocity (rate of movement) of the magnetic cartridge.

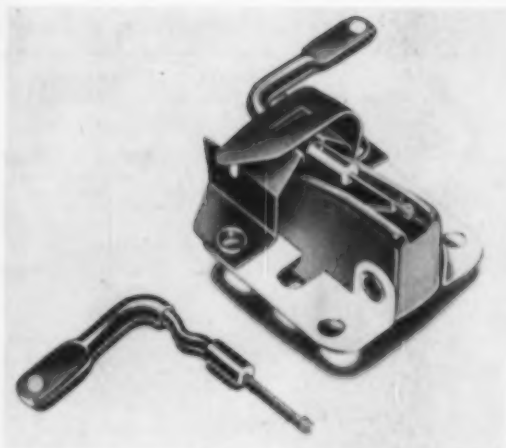
A ceramic cartridge does not need equalization to interpret correctly the information recorded on the record, and in that respect its action is quite similar to that of the well-known crystal cartridge which is still in use on most cheap phonographs and on some higher-priced ones. Unlike the crystal, the ceramic cartridge is not affected by moisture or temperature. Its frequency response is wider than the best of the crystal cartridges. The latest ceramic cartridges are quite an improvement over the earlier ones in that they have less weight and more uniform frequency response. The ceramics have a greater

lateral compliance. Compliance is an important factor in both magnetic and ceramic cartridges. This means that the phonograph needle moves relatively freely, with little springiness, and thus is able to follow the rapid variations of the record grooves more readily and with less sidewise pressure on the grooves. This reduces the tendency of the needle to jump grooves and also reduces certain kinds of distortion.

Magnetic cartridges have always been preferred because of their wider and smoother frequency response and their better compliance. The latest ceramic phono cartridges have a frequency range that is more than adequate to the needs of phonograph reproduction. To many people the difference in sound will be quite indistinguishable. Like the magnetic cartridges, some ceramic cartridges come with a single- or double-needle arrangement. Single-needle types can be had with the one-mil (.001 inch) needle for 33-1/3 and 45 rpm. records, or with a three-mil (.003 inch) needle for 78 rpm. records. Compromise two-mil (.002 inch) needles which permit use with either the slow or fast speed records are not recommended, for the compromise tip-radius stylus introduces some distortion on both kinds of records, and record wear is increased. When both regular (78) and LP records are to be played, the dual-needle type is much to be preferred to the single compromise needle.



Sonotone 1P ceramic cartridge showing replaceable single stylus.



Sonotone Tidone ceramic cartridge showing replaceable dual styli.

The price for most of the ceramic cartridges runs around \$6 for the sapphire needle and up to \$30 when the diamond needle is used. The magnetic cartridges range in price from about \$9 to \$60 (the higher figure for some of the dual or turnover diamond-needle kinds). One great advantage of a ceramic cartridge is that it does not require a preamplifier with its disadvantages of hum pickup and extra expense. Either the ceramic- or the magnetic-type cartridge is capable of producing good fidelity, although in the very best systems the magnetic cartridge is preferred.

CR's tests

The various cartridges of major manufacturers were tested for frequency response, dynamic range, distortion, compliance, and output voltage. Distortion, both harmonic and intermodulation, was measured. The latter, in each case, was of the order of 2%. An amplifier having a flat response was employed in conjunction with the RCA test record to measure the frequency range of the cartridges. The dynamic range and tonal quality were also observed using a high-fidelity recording of music.

A. Recommended

Electro Voice 84S (Electro Voice Corp., 418 Carrol, Buchanan, Mich.) \$9.60, with LP (.001 in. radius) sapphire stylus for 33-1/3 and 45 rpm. records; \$23.10 for a Model 84D, with LP diamond stylus. Single-needle ceramic cartridge; no preamplifier required. Weight, 5 grams; output, 0.6 volts at 1000 c.p.s. (lower than other ceramic models reported

Comparisons of Types of Phonograph Cartridges

	Characteristic	Humidity Effects	Temperature Effects	Strength	Average Sensitivity	Hum Pickup	Compliance	Distortion
<i>Rochelle Salt Crystal</i>	Constant Amplitude	Severe unless sealed	Ruined at temperatures above 130°F	Fragile	High; 2 volts average	Low	Poor	High
<i>Ceramic</i>	Constant Amplitude	None	None	Good; 5 times that of crystal	Good; 0.8 volt average	Low	Excellent	Low
<i>Magnetic</i>	Constant Velocity	None	None	Very Good	Poor; .010 volt average	High	Excellent	Low

on). Frequency response, substantially flat, 30 to 15,000 c.p.s., ± 2.5 db. Compliance, high (good). Dynamic range, good. Needle-talk (sound emanating from the needle itself as it vibrates in the record grooves) quite audible on loud passages. A good cartridge suitable for high-fidelity use.

General Electric RPX-050 (General Electric Co., Electronics Park, Syracuse) \$8.37, with dual sapphire styli. Magnetic cartridge; output 10 millivolts at 1000 c.p.s. Requires preamplifier. Has dual "turn-around" styli for 45, 33-1/3, or 78 rpm. records. Frequency response, substantially flat, 30 to 15,000 c.p.s., with 10 db. droop at 20,000 c.p.s. More than adequate response for high-fidelity reproduction. Tracking and compliance, excellent on three samples tested. As improvements were found on later cartridges, purchaser should ascertain that the latest production model is being purchased by checking serial numbers and selecting the highest number. (Late models tested had triangular needle-selection knob instead of a round one.)

Fairchild 215-A (Fairchild Recording Equipment Corp., 154 St. and Seventh Ave., Whitestone, N.Y.) \$29.75, with single .001-in. diamond stylus. Magnetic cartridge; output 2.5 millivolts at 1000 c.p.s. Preamplifier required. Weight, about 12 grams. Frequency response, substantially flat, 30 to 15,000 c.p.s. with 7 db. droop at 20,000 c.p.s. Tracking and compliance, excellent. 4-pole turntable motor required in order to keep hum at an acceptable low level. ¶The new 220 Series cartridge with higher output (5.0 millivolts) has not been tested but is considered excellent.

Fisher 50-LP (Fisher Radio Corp., 41 E. 47 St., N.Y.C.) \$19.95, including .001-in. radius diamond stylus. This cartridge appears identical with the Fairchild 215-A and its performance was found to be the same.

Pickering 240 (Pickering & Co., Inc., Oceanside, N.Y.) \$37.50, with single .001-in. diamond stylus. Magnetic cartridge; output 30 millivolts at 1000 c.p.s.

Requires preamplifier. Frequency response, substantially flat, 30 to 15,000 c.p.s., ± 1.5 db., with only 5 db. droop at 20,000 c.p.s. Tracking, compliance, and magnetic shielding of cartridge, excellent.

Sonotone Titone 9980-S (Sonotone Corp., Elmsford, N.Y.) \$5.59, with sapphire styli. Dual-needle ceramic cartridge; no preamplifier required. Weight, 6 grams. Output, 0.95 volts. Frequency response, ± 3 db., 30 to 15,000 c.p.s. Compliance and dynamic range, excellent. Needle-talk at a minimum even during loud passages.

Sonotone 1P (Sonotone Corp.) \$5.10, with sapphire stylus. A ceramic cartridge with single stylus for 33-1/3 and 45 rpm. records; weight, 5 grams. Output, 1.0 volt. Same as Sonotone Titone 9980-S in other characteristics.

B. Intermediate

Astatic 51-1-J (Astatic Corp., Conneaut, Ohio) \$4.35, including sapphire stylus. A single-needle ceramic cartridge. No preamplifier required. Weight, 5 grams. Output, 0.7 volts. Frequency response, substantially flat, 30 c.p.s. to 10,000 c.p.s. Compliance and dynamic range, very good. Very low needle-talk. ¶Model 55-T-J, at \$5.59, is similar, but is of the dual-needle (needle turnover) type.

Electrosonic ESL-121 (Electrosonic Labs., 35-54 36 St., Long Island City, N.Y.) \$29.95, with single diamond stylus; input transformer, \$7.50 extra. Magnetic cartridge; output, 1 millivolt at 1000 c.p.s.; requires input transformer and preamplifier. Frequency response, substantially flat, from 200 to 18,000 c.p.s., ± 2 db. 9 db. droop at 20,000 c.p.s., 10 db. droop at 30 c.p.s. (Droop at low end may be due to transformer loss.) Tracking and compliance, excellent. One sample purchased was found defective, and one transformer had an uncertain (intermittent) connection. Needle-retaining lip appears fragile, and cartridge judged less sturdy than others tested.

Automatic Record Changers

WITH the recent growth of high-fidelity sound, the record industry has been given a new lease on life. The widespread promotion of good quality reproduction of music has prompted more people than ever to buy and play records in the home.

There are many instruments upon which records may be played, ranging from the child's player with a wind-up crank and spring motor spinning the turntable, to the high-quality professional turntable and pickup arm costing several hundreds of dollars.

The serious high-fidelity music fan with sufficient financial means will probably invest in a good semiprofessional turntable with a separate pickup arm of good design that is fitted with a magnetic pickup cartridge.

A disadvantage to some (aside from cost) is that the simple turntable will take only one record at a time. Further, when that is finished the next one must be applied manually. A more convenient and time-saving method is by use of an automatic record changer. This machine (which must be connected, by wiring, to an audio amplifier and speaker) will play a considerable number of records, one at a time, automatically; the operator has only to place a stack of records on the spindle of the machine and then turn it on.

There are three main types of records for home use today: the 10-inch and 12-inch 33-1/3 rpm. microgroove (Long Play), the 7-inch 45 rpm. (with large inner hole), and the 10-inch and 12-inch 78 rpm. records. A good changer should accept all of these sizes and speeds with a minimum of fuss and bother on the part of the owner.

What to look for in a changer

For high-fidelity applications, there are certain requirements that a record changer should meet.

It should be able to play all sizes and speeds of records, with chief emphasis on good performance in the playing of 33-1/3 rpm. or long-play records. If a magnetic cartridge is used, the drive motor should be of the 4-pole synchronous type to reduce hum pickup. If a ceramic cartridge is used, the less expensive 2-pole type may be acceptable (see page 26 in this BULLETIN). The turntable should be heavy and balanced so as to revolve smoothly and at the correct constant speed to reduce "wow" and "flutter." The control should be provided with



Webcor B-1126-27 Record Changer

a neutral position wherein the drive mechanism is completely released so that when the player is out of use the rubber drive-wheel will not develop flat spots (which could cause "wow"). Smooth operation of motor and drive system will help reduce low-frequency rumble, which can be very annoying in a good high-fidelity setup in which the components and speaker have wide range and are far more sensitive to low-frequency sounds than ordinary commercial phonographs. The pickup arm should be sufficiently long and have provisions for correct mounting of the pickup cartridge so that the stylus will track properly in the record grooves.

The moderate-priced record changers do not accommodate at the same time records of different speeds. Some changers will handle different sizes of records at a loading; others function only if loaded with records of the same size. In order to play the 45 rpm. records, one must either use a large-diameter adapter spindle over the small-diameter one on the turntable (if available with the particular player) or use the separate knockout adapters (about 5 cents each) in each record.

As with any complex mechanical product, occasional servicing will be in order. Proper lubrication of moving parts and freedom from dust and grit will insure low rumble and smooth operation. The tone arm should be free to travel vertically and horizontally, without drag or the slightest roughness or sticking, and its bearings should be lubricated periodically.

There should be provisions for adjusting needle pressure, which should be set at the correct value as specified by the maker of the pickup cartridge used.

CR's tests

Three popular record changers were examined and tested by CR's engineers. They were all equipped with 4-pole motors and each had three speeds available.

Changers were checked for rumble and "wow." Also the tracking of a correctly installed cartridge was checked on each changer.

A test-tone record of flat response was played, using a direct-current-powered amplifier and a magnetic cartridge. This test was performed in order to check the amount of hum radiation from the turntable motor to the cartridge.

It was found that warped records (even slightly warped) will contribute to "wow," as will records with an enlarged center hole. Changer mechanisms were checked for wearing effect on records, especially on the center hole. Prices are so-called net, as available to consumers buying from large mail-order radio dealers. Each changer had a neutral (non-running) position, which is desirable.

B. Intermediate

Webcor, Model B-1126-27 (Webster-Chicago Corp., Chicago) \$40 (less pickup cartridge).

Description: 3-speed changer, 14 in. x 14 in., 4-pole motor, 2 plastic plug-in heads for use of separate pickup cartridges, tone-arm made of plastic. Push-off type change mechanism, no 45 rpm. spindle adapter available (user must insert metal or plastic knockout adapters in records). No intermix of records. One control selects speed, reject, and manual operation.

Performance: Speed just slightly high on all three speeds, very slight "wow"; rumble satisfactorily low. 4-pole motor with excellent torque on turn-

table. Drops records gently; spindle, which had chrome finish, would cause minimum wear on record center hole. 8-in. tone-arm gave acceptable tracking when cartridge was installed carefully. Changer shuts itself off at end of last record. 3

* * *

V-M Triomatic 935 HF (V-M Corp., Benton Harbor, Mich.) \$39 (less pickup cartridge) includes 45 rpm. spindle adapter.

Description: 3-speed changer, 13½ in. x 13 in., 4-pole motor, 2 plastic plug-in heads. Cast-aluminum tone-arm, 7½ in. long. Spindle drop mechanism with record ballast arm. Random intermix of all sizes of records of the same speed. Has 45 rpm. spindle adapter. One combined control for on-off speeds, and rejecting.

Performance: Slightly fast on all speeds, very slight "wow." Rumble is at a low level. 4-pole motor gives very good turntable torque. Drops records gently. Center hole wear low because of high-gloss chrome finish of stationary spindle. 7½ in. tone-arm gave acceptable tracking. Changer shuts itself off at end of last record. 3

Webcor, Model B-1121-270 (Webster-Chicago Corp.)

\$41, including GE triple-play magnetic cartridge.

Description: 3-speed changer, 13¼ in. x 12 in., 4-pole motor. Has factory installed GE variable reluctance "triple-play" pickup. Metal tone-arm. Spindle drop mechanism with record ballast arm. Intermix of records of same speed by using the largest size first (not satisfactory for "random intermix"). 45 rpm. spindle adapter available at \$2.94 extra. One control knob selects speed; depression of same knob operates reject.

Performance: Speed slightly high on all three ranges. Slight "wow," rumble satisfactorily low. 4-pole motor exerts excellent torque on turntable. Higher center hole wear of records than on Webcor B-1126-27, because of cut-out sections and poorer finish of center spindle. 8-in. tone-arm would have given acceptable tracking except that GE cartridge was not installed in correct alignment at the factory. Arm did not sit on its rest firmly and was easily jarred off, which could cause damage to cartridge and stylus. Changer shuts itself off at end of last record. 3

Corrections and Emendations to Consumers' Research Bulletin

Synthetic Detergents
Pages 27 and 28
Mar. '55 Bulletin

In the table and in the text it was pointed out that *Cheer* cost the consumer more on a per-ounce basis when bought in the Giant Economy size rather than the Large size. The Procter & Gamble Co., manufacturers of *Cheer*, have informed Consumers' Research that packages have been changed recently from 21 to 22 ounces for the "Large Size" package and from 51.3 to 54 ounces for the "Giant Economy Size" and that Consumers' Research obtained the regular size packages of *Cheer* reflecting the new markings while the Giant size packages pur-

chased by CR happened to be some that were still based on the old 51.3 ounce figure.

The figures for the new package sizes are as follows:

<i>Cheer</i>	Weight in oz.	Price of box	Price per oz.
Large	22	30c	1.36c
Giant Economy	54	72c	1.33c

On the basis of the new 54-oz. "Giant Economy Size" package, the consumer would realize a saving of slightly more than 2 percent by buying that instead of the "Large Size."

Ratings of Motion Pictures

THIS section aims to give critical consumers a digest of opinion from a wide range of motion picture reviews, including the motion picture trade press, leading newspapers and magazines—some 19 different periodicals in all. The motion picture ratings which follow thus do not represent the judgment of a single person, but are based on an analysis of critics' reviews.

The sources of the reviews are:

Box Office, Cue, Daily News (N. Y.), *The Exhibitor, Films in Review, Harrison's Report, Joint Estimates of Current Motion Pictures, Motion Picture Herald, National Legion of Decency, Newsweek, New York Herald Tribune, New York Times, The New Yorker, Parents' Magazine, Release of the D. A. R., Preview Committee, Reviews and Ratings by the Protestant Motion Picture Council, The Tablet, Time, Variety* (weekly).

The figures preceding the title of the picture indicate the number of critics whose judgments of its entertainment values warrant a rating of A (recommended), B (intermediate), or C (not recommended).

Audience suitability is indicated by "A" for adults, "Y" for young people (14-18), and "C" for children, at the end of each line.

Descriptive abbreviations are as follows:

adv—adventure
biog—biography
c—in color (Anasco, Eastman, Technicolor, Trucolor, Warner Color, etc.)
car—cartoon
com—comedy
cri—crime and capture of criminals
doc—documentary
dr—drama
fan—fantasy
hist—founded on historical incident
mel—melodrama
mus—musical
mys—mystery
nov—dramatization of a novel
rom—romance
sci—science fiction
soc—social problem drama
trav—travelogue
war—dealing with the lives of people in wartime
wrs—western

A	B	C	
—	5	3	Abbott and Costello Meet the Keystone Kops.....com AY
—	5	4	Abbott and Costello Meet the Mummy.....com AY
—	4	6	Adventures of Sadie, The (British).....com A
—	1	5	Affairs of Messalina, The (Italian).....hist-dr A
—	—	3	African Manhunt.....mel A
—	4	3	Ain't Misbehavin'.....mus-com-c A
—	9	4	Americano, The.....mel A
—	8	2	An Annapolis Story.....war-dr-c AY
—	3	6	Angela.....mel A
1	1	1	Assignment Children.....doc-c AY
5	9	2	Bad Day at Black Rock.....soc-dr-c A
1	10	6	Battle Cry.....war-dr-c A
—	7	3	Battle Taxi.....war-mel AY
—	12	2	Beachcomber, The (British).....mel-c A
—	—	5	Bed, The (French).....com A
—	2	12	Bedevilled.....mel-c A
—	6	4	Belles of St. Trinian's, The (British).....com A
—	5	8	Big Combo, The.....cri-mel A
—	3	9	Big House, U.S.A.....cri-mel A
—	1	3	Big Tip Off, The.....cri-mel A
—	6	8	Black Tuesday.....mel A
3	9	4	Blackboard Jungle, The.....soc-dr A
7	10	1	Bridges at Toko-Ri, The.....war-dr-c A
—	3	1	Bring Your Smile Along.....mus-com-c AY
—	5	7	Bullet for Joey, A.....cri-mel A

A	B	C	
—	4	5	Canyon Crossroads.....mel AY
—	9	3	Captain Lightfoot.....adv-c A
—	—	3	Carolina Cannonball.....com A
—	1	2	Cavalcade of Song (Italian).....mus-dr A
—	4	9	Cell 2455, Death Row.....cri-mel AY
—	5	7	Chance Meeting (British).....dr A
—	5	4	Chicago Syndicate.....cri-mel A
1	7	5	Chief Crazy Horse.....mel-c AY
—	4	2	Cobweb, The.....nov-c A
1	9	4	Conquest of Space.....sci-c A
—	2	1	Court Martial (British).....war-dr A
—	5	4	Crashout.....mel A
—	2	6	Creature with the Atom Brain.....sci-mel A
—	6	3	Cult of the Cobra.....mel A
4	11	1	Daddy Long Legs.....mus-com-c AY
—	3	—	Dam Busters (British).....war-mel AY
1	8	4	Davy Crockett.....biog-c AY
—	2	2	Day to Remember, A (British).....com AY
—	3	—	Desperate Women, The.....soc-dr A
—	5	5	Destry.....wes-c A
—	3	—	Devil Goddess.....adv AY
—	1	8	Devil's Harbor (British).....mel AY
—	1	4	Dial Red O.....cri-mel A
1	11	5	Doctor in the House (British).....com-c A
7	4	3	East of Eden.....dr-c A
—	4	2	Eight O'Clock Walk (British).....cri-mel AY
—	6	10	End of the Affair, The (British).....dr A
—	2	8	Escape to Burma.....mel-c A
—	10	2	Eternal Sea, The.....biog AY
—	11	3	Far Country, The.....mel-c A
—	6	4	Far Horizons, The.....mel-c AY
—	2	1	Female on the Beach.....dr A
—	2	2	Finger Man.....cri-mel A
—	7	12	Five Against the House.....cri-mel A
—	3	2	Five Guns West.....mel-c A
—	3	3	Foxfire.....dr-c A
—	2	2	Francis in the Navy.....com AY
—	2	6	Front Page Story (British).....mel A
—	6	—	Fuss Over Feathers (British).....war-dr AY
—	5	6	Game of Love (French).....dr A
—	3	3	Gangbusters.....cri-mel A
7	3	2	Gate of Hell, The (Japanese).....dr-c A
3	10	4	Glass Slipper, The.....mus-fan-c AY
—	3	9	Good Die Young, The (British).....cri-mel A
—	4	1	Gran Varieta (Italian).....com-c A
—	6	4	Great Adventure, The.....doc AY
—	12	3	Green Fire.....dr-c A
—	2	11	Green Magic.....trav-c A
—	8	4	Green Scarf, The (British).....mys-mel A
—	2	1	Hamido (Egyptian).....mel A
1	8	3	Heartbreak Ridge.....war-dr-c A
1	3	—	Hell's Gate (Japanese).....dr-c A
—	4	7	Hell's Island.....mel-c A
—	4	6	Hell's Outpost.....mel A
—	2	3	High Society.....com AY
—	2	8	Hiroshima (Japanese).....propaganda-war-dr A
1	7	9	Hit the Deck.....mus-com-c A
1	10	1	Holiday for Henrietta (French).....com A
1	5	—	House of Bamboo.....cri-mel-c A
1	9	1	Hunters of the Deep.....doc-c AY
—	5	—	I Cover the Underworld.....cri-mel A
—	3	6	Imposter, The (Japanese).....dr A
—	8	2	Innocents in Paris (British).....com A
5	7	4	Interrupted Melody.....mus-biog-c A

A	B	C
—	8	1 Intruder, The (British) war-dr A
—	4	2 It Came from Beneath the Sea sci AY
—	—	4 Jail Bait cri-mel A
—	3	4 Jump Into Hell war-dr A
—	1	2 Jungle Gents com AYC
—	1	7 Jungle Moon Men adv AYC
2	7	6 Jupiter's Darling mus-com-c A
—	2	1 Karamoja doc-c A
—	1	10 Kiss Me Deadly cri-mel A
4	5	2 Lady and the Tramp mus-car-c AYC
—	7	8 Land of Fury (British) dr-c A
1	2	1 Land of the Pharaohs dr-c A
—	4	6 Las Vegas Shakedown mel A
—	7	1 Life in the Balance, A mel A
4	11	2 Long Gray Line, The dr-c AYC
1	6	3 Long John Silver adv-c A
—	4	6 Looters, The cri-mel A
—	2	3 Love in the City (Italian) dr A
4	9	3 Love Me or Leave Me mus-biog-c A
—	4	6 Ma and Pa Kettle at Waikiki com AYC
—	2	4 Mad at the World soc-dr A
—	5	7 Magnificent Matador, The dr-c A
—	3	15 Mambo (Italian) mus-dr A
6	9	1 Man Called Peter, A biog-c AYC
—	5	5 Man from Bitter Ridge, The wes-c A
2	1	2 Man from Laramie, The wes-c A
—	12	5 Man Without a Star wes-c A
—	8	5 Many Rivers to Cross mel-c A
—	1	8 Marauders, The mel-c A
5	12	— Marty dr A
—	1	2 Master Plan, The (British) mys-mel A
—	1	3 Midnight Episode (British) mys-mel A
5	2	1 Mister Roberts war-com-c A
—	2	3 Mlle. Gobette (Italian) com A
—	8	4 Moonfleet adv-c A
—	3	5 Murder in Villa Capri cri-mel A
—	1	5 Murder is My Beat cri-mel A
—	2	5 Naked Heart, The (Canadian) dr A
—	3	10 New Orleans Uncensored mel A
—	6	7 New York Confidential cri-mel A
—	2	1 No Way Back (German) war-mel A
4	3	7 Not as a Stranger dr A
—	—	3 Open Secret soc-mel A
1	7	2 Othello dr A
—	2	7 Other Woman, The mel A
—	—	3 Paid to Kill (British) mys-mel A
—	4	5 Pirates of Tripoli adv-c A
—	4	3 Port of Hell mel A
5	8	4 Prince of Players biog-c A
—	2	1 Princess Cinderella (Italian) fan AYC
2	2	— Private War of Major Benson, The com-c AY
—	8	4 Prize of Gold, A war-mel-c A
—	5	13 Prodigal, The dr-c A
—	10	4 Purple Mask, The adv-c AYC
—	10	6 Purple Plain, The (British) war-dr-c A
—	9	9 Racers, The mel-c A
—	7	1 Rage at Dawn mel-c AYC
—	2	9 Revenge of the Creature mel AYC
—	3	— Road to Denver, The wes-c AYC
—	4	4 Robbers' Roost mus-wes-c A
—	11	6 Run for Cover mel-c A
—	—	7 Sabaka mel-c A
—	7	1 Santa Fe Passage wes-c AYC
—	2	2 Scarlet Coat, The hist-dr-c A
—	6	8 Sea Chase, The war-dr-c A
—	2	3 Sea Shall Not Have Them, The (British) war-dr A
—	—	9 Seminole Uprising mel-c AYC
—	5	6 Seven Angry Men hist-dr A
2	6	1 Seven Little Foys biog-c A
4	6	3 Seven Year Itch, The com-c A
—	7	5 Shotgun wes-c A
—	5	1 Shrike, The dr A
1	5	8 Silver Chalice, The dr-c A

A	B	C		
—	—	3	Silver Star, The	wes AY
—	—	3	Simba (India)	dr-c A
1	8	6	Six Bridges to Cross	cri-mel A
—	3	—	Skabengas	doc-c A
—	8	3	Smoke Signal	wes-c AYC
—	6	9	Soldier of Fortune	adv-c A
—	—	5	Son of Sinbad	fan-c A
—	3	—	Square Ring, The (British)	mel
—	9	4	Strange Lady in Town	dr-c A
—	9	1	Stranger on Horseback	mel-c AYC
—	7	3	Stranger's Hand, The	
			(British-Italian)	mys-mel A
5	9	2	Strategic Air Command	war-dr-c AYC
2	7	3	Summertime	dr-c A
—	—	4	Sunderin (German)	dr A
—	4	3	Tall Man Riding	wes-c A
—	1	5	Target Earth	sci A
—	1	7	Tarzan's Hidden Jungle	adv A
—	4	5	Ten Wanted Men	wes-c A
—	1	3	Tender Hearts	dr A
—	2	2	Terror in the Night	cri-mel A
—	1	9	That Lady (British)	hist-dr-c A
5	6	6	There's No Business Like	
			Show Business	mus-com-c A
—	4	2	They Were So Young	soc-dr A
1	9	3	This Island Earth	sci-c AY
—	6	4	Three Cases of Murder (British)	cri-mel A
—	4	12	Three for the Show	mus-dr-c A
—	4	1	Tiger and the Flame, The (India)	dr-c A
—	12	2	Tight Spot	cri-dr A
—	4	7	Timberjack	mus-mel-c AYC
—	7	4	To Paris With Love (British)	com-c A
—	2	2	Too Young for Love (Italian)	dr A
—	2	9	Top of the World	dr A
—	2	8	Treasure of Ruby Hills	wes AYC
—	5	3	Trouble in Store (British)	com AYC
—	1	3	True and the False, The (Swedish)	dr A
7	5	1	20,000 Leagues Under the Sea	adv-c AYC
1	9	6	Underwater!	mel-c A
—	5	10	Untamed	mel-c A
1	8	6	Vera Cruz	mel-c A
1	9	5	Violent Men, The	mel-c A
—	11	8	Violent Saturday	mel-c A
1	6	5	Wages of Fear, The	
			(French)	propaganda-dr A
—	2	6	Wayward Wife (Italian)	dr A
—	4	2	We're No Angels	com-c A
1	9	2	White Feather	wes-c A
—	3	1	Wichita	wes-c AYC
—	5	9	Women's Prison	soc-dr A
—	4	5	Wyoming Renegades	wes-c A
—	—	5	Yellowneck	war-dr-c A
1	11	3	Young at Heart	mus-com-c A
2	3	1	You're Never Too Young	mus-com-c A

Reissues (oldtimers you may have seen before) as previously rated in the CR Bulletin indicated:

7	9	—	Anchors Aweigh (March '46).....	mus-com-c	AYC
3	12	2	Asphalt Jungle, The (Dec. '50).....	mel	A
5	7	3	Battleground (Apr. '50).....	war-dr	A
—	12	5	Berlin Express (Dec. '48).....	war-mel	AY
1	8	8	Big Sleep, The (Apr. '47).....	cri-mel	A
—	12	1	Big Street, The (Jan. '43).....	dr	A
13	5	1	Bringing Up Baby (Di. Dec. '38).....	com	AYC
1	13	4	Champion, The (Nov. '49).....	mel	A
3	11	4	Home of the Brave (Jan. '50).....	propaganda-dr	A
5	12	2	I Remember Mama (Oct. '48).....	com	AYC
—	13	4	Petty Girl, The (March '41).....	com-c	A
—	11	5	Return of October (July '49).....	com-c	A
4	9	4	Saratoga Trunk (June '46).....	mel	A
—	8	4	They All Kissed the Bride (March '43).....	com	A
18			Wizard of Oz (Di. March '40).....	fan	AYC

The Consumers' Observation Post

(Continued from page 4)

MANY VITAMIN PREPARATIONS CONTAIN SUBSTANCES that are not yet proved to have nutritional value, according to Professor L. A. Maynard of Cornell. Dr. Maynard points out that vitamin E, for example, is important in the reproductive activity of rats, but there is no evidence that it serves any purpose in human nutrition. He also notes that, since the daily need of vitamin A for a healthy person is 5000 units, there is no point in taking more than this amount on the theory that twice as much is still better; the excess just passes through the body and is wasted. Vitamin preparations may need to be taken as a temporary measure in certain cases where there is a food allergy or a dietary restriction exists, but the healthy person can best obtain his nutritional requirements from a well-balanced diet.

* * *

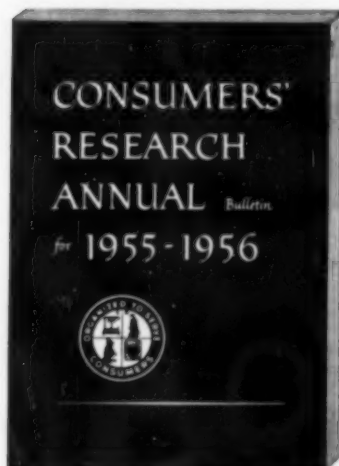
FOOD FREEZERS may be a great convenience for people who grow a considerable part of the family's food supply. For city dwellers, however, such appliances are little more than white elephants. With these shrewd observations made by the Food Field Reporter, CR is in hearty agreement.

* * *

FLAMMABLE SILK SCARVES were the subject of a recent complaint against three New York firms by the Federal Trade Commission proceeding under the Flammable Fabrics Act, which gives the F.T.C. power to proceed against certain wearing apparel that is highly flammable. Such scarves are often used by young girls as head coverings. In the light of a recent study in the Journal of the American Medical Association which pointed out that almost half of the burns of children are due to ignition of clothing, it is obviously important that such items meet the standards of performance of the Flammable Fabrics Act requiring silk garments to withstand exposure to flame for an indicated period without igniting.

* * *

THE CHARGES FOR REPAIRING TV SETS are sometimes increased by replacement of parts, particularly tubes, that are in good working order. The practice is the subject of complaint to many Better Business Bureaus throughout the country. Recently a CR subscriber in Philadelphia sent in a newspaper account of a television repair service in his section where the firm had advertised that it charged a dollar plus the cost of parts for repairs. In one case, where all that was needed was the replacement of a



Ready next month—

The consumer's handbook of buying—that's what many people call CR's big Annual Bulletin—will be off the press early next month. No well-run household should be without its 224 pages packed with ratings of products by brand name and other useful buying advice. It is fully indexed in order to provide ready reference. Before making an important purchase, look up the item in Consumers' Research. It pays to buy "from the book."

To make certain of getting a copy of the Annual Bulletin as soon as it is off the press, use the handy order blank on the next page. (See special rate for CR subscribers!)

defective tube at a cost of something like \$1.23, five were replaced and the owner was charged \$28. In another case, where a resistor was short-circuited, the set was taken to the shop where four tubes were replaced and the resistor repaired for a charge of \$14. Another practice was to give a repair estimate of \$20, then take the set to the shop, and in one case the customer was told the work would cost \$62. Better Business Bureaus in all sections of the country have been alerted to the problem, and consumers who have difficulties along these lines will be wise to get in touch with their local Bureau.

* * *

TRAVELERS RETURNING FROM ABROAD usually face the unpleasant task of having their soiled garments pawed through by the customs officer whose duty it is to inspect all incoming luggage. Now a new technique has been evolved to simplify the examination by using an X-ray unit, designed to detect hidden goods. The trouble is that X-rays will fog film, and the Photographic Society of America Journal suggests that it is a good idea to tag your cameras and any luggage containing spare, undeveloped film with the warning "Customs: This luggage contains film not yet developed. Please do not expose to X-ray without letting me remove film."

* * *

NEW OR NEWLY TESTED:

DISPOSA-PAN (Disposa-Ware Corp., Philadelphia) One set consisting of 1 holder and 8 disposable aluminum pans, \$2.98; additional package of 30 pans, \$1.65. **DISPOSA-PAN** is a shaped utensil of aluminum foil the size of a skillet to be inserted in its own welded wire holder or frame for cooking food. Then the foil pans may be disposed of in the garbage pail, or may be washed out and re-used. Care must be taken not to prick the thin foil with a cooking fork or other kitchen utensil. The device was found to do an effective job, but it required more watching than a heavier pan. It would be a labor and time saver in washing up, but somewhat expensive to use. We think that probably most women would consider it more as a novelty than as a practical utensil for daily use in the kitchen.

Perma-Scrub Brush, No. 160 (Modglin Co., Inc., Los Angeles 41), 29c at chain variety stores. This brush has red plastic bristles and a white plastic handle. For general home use, it was found effective in scrubbing hairbrushes and combs because the bristles were stiff and long. It was found useful for applying cleanser to various surfaces of the range and for removing dirt from crevices and corners, particularly in pots and pans. The bristles, however, were of a brittle type of plastic and broke off quite easily. The brush's usefulness was considered somewhat too specialized for a general all-around kitchen brush.

Consumers' Research, Inc.

WASHINGTON, NEW JERSEY

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Phonograph Records

BY WALTER F. GRUENINGER

Please Note: The first symbol applies to quality of interpretation, the second to fidelity of recording.

Beethoven: *Symphony No. 7*. Vienna State Philharmonia. *Symphony No. 1*. Bamberg Symphony. Both under Perle. Vox PL 9120. \$5.95. An hour of Beethoven symphonies on one disk is a bargain when they are played as well as this. Very well recorded, but for best performances, turn to Toscanini. A AA

Bizet: *L'Arlesienne Suite & Fauré: Pelléas et Mélisande Suite*. Orchestra of the Paris Opera under Le Conte. Capitol P 8311. \$4.98. While the Bizet is the more popular, probably ranking next to his *Carmen* in more ways than one, the Fauré is the more gentle, poetic, deep. Sensitive playing and wide-range recording. AA AA

Chopin: *Concerto No. 2 & Saint-Saëns: Concerto No. 4*. Brailowsky (piano) with the Boston Symphony Orchestra under Munch. RCA Victor LM 1871. \$3.98. If Brailowsky played the Saint Saëns as well as he plays the Chopin, this would rate as an outstanding disk. Well recorded. A AA

Couperin: *Lecons de Ténèbres*. Cuénod, Sinimberghi (tenors). Westminster WL 5387. \$5.95. An arresting disk. These "lessons of darkness" for the Holy Week reach the pinnacle of Couperin's church music. The burden of the singing falls on Cuénod whose voice is not one of remarkable beauty, but it is clear, precise, distinctive. Very well recorded. A AA

Menotti: *The Saint of Bleeker Street*. Poleri, Lane, Ruggiero, etc., under Schippers. 4 sides, RCA Victor LM 6032. \$7.96. Menotti's new opera will not displace *Tosca* which its music recalls, but it is certainly destined for wide hearing over the next few years. After seeing the opera on Broadway I have found this recording thoroughly absorbing. The original cast, trained by Mr. Menotti, is first rate. AA AA

Mussorgsky: Sunless & Prokofiev: Five Poems & Gretchaninoff: Six Songs. Maria Kurenko (soprano). Capitol P 8310. \$4.98. Superior interpretations of Russian art songs. The engineers have done a disservice to the production by putting the piano too far in the background. There's a "scar" on my record near the beginning of side 2, indicating poor inspection. AA A

Mozart: *Sonatas 11, 15, 5 and Rondo*. Novaes (piano). Vox PL 9080. \$5.95. An hour of enchanting music sensitively played and clearly recorded. AA AA

Ravel: *Concerto in G and Left Hand Concerto*. Doyen with the Orchestra des Concerts Lamoureux under Fournet. Epic 3LC 3123. \$3.98. Ravel's last works—brilliant, exuberant. Very well played. AA A

Revueltas: Sensemayá, Cuauhnahuac & Mossolov: Iron Foundry & Chabrier: España. Philharmonic-Symphony Orchestra of London under Quadri. Westminster W-LAB 7004. \$7.50. Not much musical value here, but excitement for hi-fi "demonstrators." Striking reproduction of percussion. AA AA

Rodgers: Oklahoma Suite and Carousel Suite. Morton Gould and His Orchestra. RCA Victor LM 1884. \$3.98. Though I do not care for the way in which Gould has fancied up Rodgers' fine score of *Oklahoma*, he has made a tasteful arrangement of *Carousel*. I prefer the music sung, however. The musicians play well and the fidelity is excellent. AA AA

Rossini: Seven Great Overtures. Vienna State Opera Orchestra under Rossi. Vanguard VRS 456. \$4.98. "Italian in Algiers," "Semiramide," "Turk in Italy," etc. There's more nuance in Toscanini's recording of some of these spirited pieces but Rossi's playing certainly sparkles and will satisfy most listeners. A AA

Rossini: Stabat Mater. Stader, Radex, Hafliger, Borg, etc., under Fricsay & **Mozart: Exsultate Jubilate. 4 sides, Decca DX 132. \$9.96. "Operatic" sacred music by Rossini that demands topflight singing which it almost gets here, despite the fact that soprano Stader shows a lack of respect for the composer's directions in the "Inflammatus." There is better singing on Oceanic OCS 24, but recording of the latter is poor. The showy Mozart is well sung by Stader, except that the famous "Alleluja" lacks full brilliance. A A**

Schubert: Symphony No. 9. Hallé Orchestra under Barbirolli. RCA Victor LBC 1085. \$2.98. A great symphony which belongs in every record library. Well performed and released at a low price. While my vote still goes to Bruno Walter conducting this work on Columbia 3ML 4093, budget buyers will find this disk quite satisfactory. A AA

Strauss, Johann Jr. and Josef: Vienna Bonbons and Other Waltzes, Polkas, Marches, and Galops. Vienna State Opera Orchestra under Paulik. Vanguard VRS 459. \$4.98. Delightful assortment of eight light Viennese numbers likely to set feet tapping. Played with a firm beat and well recorded. AA AA

Music of Vivaldi: Virtuosi di Roma under Fasano. Decca DL 9729. \$4.98. Four concerti for violins and strings beautifully played. AA A

Christel Goltz (soprano). Decca DL 9778. \$4.98. Final scene from "Salome" and arias from "Fidelio," "Oberon," etc. "Salome" comes off best. There is clarity, accurate pitch and good musicianship. Satisfactorily recorded. A A

Melodies of Love. Wayne King and His Orchestra. Decca DL 8124. \$3.98. Popular waltzes featuring strings and a saxophone. Played straightforwardly. Pleasant listening. AA A

The Wild Side of Life. Burl Ives (folksinger). Decca DL 8107. \$3.98. Songs recorded in Nashville: "a gallery of portraits of characters—a bit on the untamed side of life." Most of these are regarded as "contemporary folksongs." Very well sung and recorded. AA AA

This is the playback equipment on which I hear the LP's I discuss in this column.

Fairchild 220 diamond stylus cartridge mounted on a Livingston Universal arm connected into a Scott 121 Dynaural equalizer-preamplifier which in turn feeds a Florac 30-watt power-amplifier. My three-way speaker system consists of three tweeters hooked up in parallel: Electro-Voice T 35, University HF 206, Atlas HF 11; one middle speaker: Cinaudagraph HW 13-131; one woofer: 18-inch Cinaudagraph†. I have separate volume controls in the power-amplifier for the three speaker channels.

Presently all but the Electro-Voice and University speakers are mounted facing front in a 20-cubic-foot infinite baffle cabinet situated across a corner of my living room. The University speaker is on top of the cabinet facing a wall at a 45-degree angle toward the front of the cabinet and the Electro-Voice is on top of the cabinet facing the ceiling. These speakers are hidden by half a dozen appropriate figurines.

I would be most reluctant to exchange this equipment for any other I have heard even though the two biggest speakers date from about 1940. Professional musicians who often visit our home say they have never heard any better reproduction.

† Not currently available.



OUR READERS WRITE:

We have subscribed to your publication for nine years and seldom make a purchase before consulting your monthly issues or Annual Bulletin. My husband built our Hi-Fi according to your suggestions, and we like it very much. Continued success to Consumers' Research, Inc!

Homemaker, Chicago, Ill.

We would like to congratulate you on the thorough study you have made of portable electric tools in Consumers' Research Bulletin of January 1955. This is an outstanding analysis and one that will be helpful to both the manufacturer and consumer.

Manufacturer in Northern New York

I am desirous of taking out an annual subscription to your Consumers' Research Bulletin. My sister is a subscriber to your publication and I have been meaning to take out a subscription for a long time as I think this an essential in every household. I have found it such a great help in the purchasing of various articles.

Homemaker, Brooklyn, N. Y.

We have just recently purchased a home and are in the process of buying appliances, furniture, etc. Your magazines have given us invaluable assistance in this connection.

Attorney, Indianapolis, Ind.

For the past four years we have been enjoying every monthly copy of your Consumers' Research and your Annual Bulletins. They have been a most helpful guide to us in our numerous big purchases for our new house and in our everyday purchases of household supplies, clothing, etc. We have kept all the copies, and we refer to them often.

Homemaker, Richmond, Calif.

Incidentally, your CR Annual has been of inestimable value to me in selecting Christmas presents for the family. My compliments on an excellent job.

Public Relations Executive, Springfield, Mass.

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